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THE CYCLOPHORID OPERCULATE LAND MOLLUSKS OF AMERICA

By
CARLOS DE LA TORRE
PAUL BARTSCH
and
JOSEPH P. E. MORRISON

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The present work forms No. 181 of the *Bulletin* series.

Alexander Wetmore,
Assistant Secretary, Smithsonian Institution.

Waskington, D. C., *June 9, 1942.*

CONTENTS

Page

Introduction and acknowledgments 1

The cyclophorid mollusks of Cuba, by Carlos de la Torre and Paul Bartsch 3

  Family Cyclophoridae 3

    Subfamily Megalomastominae 3

      Genus *Farcimen* 4

        Subgenus *Farcimen* 5

    Subfamily Aperostominae 38

      Genus *Crocidopoma* 39

        Subgenus *Cyclocubana* 39

The cyclophorid mollusks of the West Indies, exclusive of Cuba, by Paul Bartsch 43

  Family Cyclophoridae 43

    Subfamily Megalomastominae 43

      Genus *Farcimen* 43

        Subgenus *Neopupina* 43

      Genus *Farcimoides* 46

      Genus *Megalomastoma* 48

        Subgenus *Megalomastoma* 48

        Subgenus *Megalomastomoides* 50

    Subfamily Diplommatininae 51

      Genus *Adelopoma* 51

    Subfamily Amphicyclotinae 52

      Genus *Cyclohaitia* 52

      Genus *Amphicyclotulus* 54

        Subgenus *Amphicyclotulus* 54

        Subgenus *Cycloblandia* 60

    Subfamily Aperostominae 62

      Genus *Crocidopoma* 62

        Subgenus *Crocidopoma* 62

      Genus *Cyclojamaicia* 67

      Genus *Cyclovendreysia* 69

      Genus *Cyclopilsbrya* 71

        Subgenus *Cyclopilsbrya* 71

        Subgenus *Cyclocaymania* 79

      Genus *Ptychocochlis* 82

      Genus *Poteria* 105

        Subgenus *Poteria* 106

        Subgenus *Cyclobakeria* 115

      Genus *Aperostoma* 124

        Subgenus *Cycladamsia* 125

        Subgenus *Austrocyclotus* 132

        Subgenus *Cyclohidalgoa* 136

      Pseudogeneric term *Incerticyclus* 137

Page
The cyclophorid mollusks of the mainland of America, by PAUL BARTSCH and JOSEPH P. E. MORRISON 142
  Family Cyclophoridae 142
    Subfamily Megalomastominae 142
      Genus *Tomocyclus* 142
    Subfamily Diplommatininae 148
      Genus *Adelopoma* 148
    Subfamily Amphicyclotinae 151
      Genus *Buckleyia* 151
      Genus *Lagocyclus* 154
      Genus *Filocyclus* 157
      Genus *Calaperostoma* 159
      Genus *Cyrtotoma* 169
      Genus *Barbacyclus* 175
      Genus *Calacyclotus* 178
      Genus *Mexcyclotus* 179
      Genus *Megacyclotus* 181
      Genus *Amphicyclotus* 183
    Subfamily Aperostominae 186
      Genus *Aperostoma* 187
        Subgenus *Incidostoma* 187
        Subgenus *Austrocyclotus* 195
        Subgenus *Neocyclotus* 203
        Subgenus *Cyclopomops* 219
        Subgenus *Aperostoma* 221
        Subgenus *Cyclohidalgoa* 268
      Genus *Liracyclotus* 274
      Pseudogeneric term *Incerticyclus* 275
  A list of the mainland cyclophorids 279
Explanation of plates 283
Index 293

THE CYCLOPHORID OPERCULATE LAND MOLLUSKS OF AMERICA

By Carlos de la Torre, Paul Bartsch, and Joseph P. E. Morrison

INTRODUCTION AND ACKNOWLEDGMENTS

This contribution is divided into three parts: Part 1, by Drs. Carlos de la Torre and Paul Bartsch, deals with the forms inhabiting the island of Cuba. Part 2, by Dr. Bartsch, describes the members of the family known from the West Indies exclusive of Cuba. In Part 3, Drs. Bartsch and Joseph P. E. Morrison discuss the mainland fauna. While Part 3 is by far the largest portion of the paper, it probably represents only a small fraction of the cyclophorid fauna inhabiting this extensive territory, the exploration of which has scarcely been started.

We have not attempted to give complete bibliographic references to all the species, since this would necessitate an enormous expansion of the text, but all the citations involving problems of nomenclature have been noted.

The completeness of this monograph was made possible through the splendid cooperation of the authorities of the Academy of Natural Sciences of Philadelphia, particularly Dr. H. A. Pilsbry. We are indebted also to Prof. H. Burrington Baker, of the University of Pennsylvania, who unstintingly turned over for our examination all the material needed in this group, especially from Jamaica. We are glad, too, to acknowledge our obligation to Dr. d'Alté A. Welch for his splendid collection of Jamaican cyclophorids, which he placed at our disposal. The authorities of the Museum of Comparative Zoology at Cambridge, Mass., through Dr. W. J. Clench, aided materially by the loan of specimens for study.

The cyclophorid material from Cuba came from several sources, chief in importance being the extensive collection of Dr. de la Torre, which furnished the major basis of our understanding of the genus *Farcimen.* Next should be mentioned the large collections made several years ago by Dr. Bartsch on several collecting expeditions that enabled him to comb the island for mollusks. These were made possible through the generosity of the late John Brooks Henderson and through the agency of the Walter Rathbone Bacon Traveling Scholarship of the Smithsonian Institution. Especial thanks are due Prof. Raul P. Guitart for his helpfulness with specific material needed by us in the region covered by his explorations, but to mention all the others who contributed material to our understanding of the fauna of the Island of Cuba would prolong endlessly these acknowledgments. We have mentioned under the various species the collectors to whom we are especially indebted for such contributions.

Our knowledge of the radulas, jaws, and verges discussed in this paper is based on dissections made by Dr. Morrison.

PART 1.—THE CYCLOPHORID MOLLUSKS OF CUBA

By CARLOS DE LA TORRE AND PAUL BARTSCH

Family CYCLOPHORIDAE Gray

Terrestrial taenioglossate prosobranchiates the mantle cavity of which has been developed into a thin-walled pulmonary sac. The tentacles are attenuatedly elongate-conic, bearing the optic papillae at their outer base. Snout usually short. Foot attenuate posteriorly, entire. The radula rows consist of seven teeth. The shell shape, size, and ornamentation are extremely diversified. The operculum, usually circular, may be a simple chondroid plate or this may bear lamellae or calcifications of various types.

The family ranges from Mexico south over South America on the mainland as well as over the West Indian Islands.

In Cuba it is represented by two subfamilies, which the following key will help to differentiate:

KEY TO THE CUBAN SUBFAMILIES OF THE FAMILY CYCLOPHORIDAE

Shell elongate-conic	Megalomastominae
Shell helicoid	Aperostominae

MEGALOMASTOMINAE, new subfamily

Cyclophorid mollusks having an elongate-conic or elongate-turrited shell. Operculum corneous.

This subfamily embraces the mainland *Tomocyclus*, which comes from Guatemala and the adjacent Mexican Chiapas, the Cuban *Farcimen*, the Hispaniolan *Farcimoides*, the Puerto Rican *Neopupina*, typical *Megalomastoma* from the Virgin Islands, and its related subgenus *Megalomastomoides* from eastern Puerto Rico.

Wherever found the animal lives in leaf mulch, or it may even dig in the loose earth about the base of plants until it is completely hidden from sight. Bartsch found *Farcimen* (*Neopupina*) *curtum* (Dall and Simpson) buried completely among the roots of banana trees on the east slope of El Yunque in Puerto Rico. On days of protracted rain they may venture forth from their hiding place and sometimes may climb a foot or so above ground up on the trunk of a mulch-surrounded tree.

Genus FARCIMEN Troschel

1847. *Farcimen* TROSCHEL, Zeitschr. Malak., vol. 4, p. 44, in part.

1847 (November). *Farcimen* HERMANNSEN, Indicis generum malacozoorum primordia, vol. 1, p. 439. (Type designated, *Cyclostoma tortum* Wood.)

Typical *Farcimen* is known only from Cuba, where it is widely distributed and presents considerable variation in shell shape and sculpture. In shape it varies from ovate to elongate-conic. The sculpture, following an initial smooth nuclear portion, may be smooth, axially lirate, or even ribbed, spiral threads may be present, or the surface may be pitted as in the *Farcimen alutaceum* group. The peristome is heavily reenforced by a thickening and is reflected. The operculum consists of a simple, thin, multispiral chrondroid plate.

Type: *Turbo tortus* Wood=*Farcimen* (*Farcimen*) *tortum* (Wood).

The anatomy of *F.* (*F.*) *vinalense scopulorum* is described under that subspecies, p. 34.

All members of the genus *Farcimen* are mulch-dwellers; they find their optimum habitat where dead leaves and vegetable detritus become mixed with sand or soil at the base of stone walls or paredónes or dead trees. Here usually there is sufficient moisture to furnish ideal conditions for the development of fungi, upon whose mycelial threads they seem largely to subsist. Living specimens are therefore rarely seen on the surface. It is only on wet days or dewy nights that they appear to come from their hidings and may then climb for some feet above the level normally occupied by them. Usually they burrow below the surface and have to be sought by grubbing for them. For these reasons the shells of most species are partly covered with dirt when found.

This leaf-mulch dwelling does not tie them to the restricted habitat that the calciphilous annularids are forced to effect. We therefore find the various species occupying a much more extended territory than is the case in the annularids. They are not confined to the mountains but are equally at home in the plains, where their worst enemy is agriculture, which usually destroys their favorite habitats. Their greater abundance in the rough hilly country at present merely means that man's activities so far have failed to dispossess them.

The absence of strongly developed sculptural characters makes the genus *Farcimen* a rather trying group to handle taxonomically. Words alone seem inadequate to define convincingly our concept of species and races. Fortunately, by the use of the camera we are able to portray the characters far better than mere word pictures can accomplish. We hope, therefore, that by consulting both descriptions and figures our contentions will be made clear.

KEY TO THE SUBGENERA OF FARCIMEN

Peristome thickened and reflected	Farcimen
Peristome not thickened or reflected	Neopupina

Subgenus FARCIMEN Troschel

In the subgenus *Farcimen* the peristome is thickened and reflected. The group is peculiar to the island of Cuba.

Type: *Turbo tortus* Wood=*Farcimen* (*Farcimen*) *tortum* (Wood).

FARCIMEN (FARCIMEN) PSEUDOTORTUM, new species

Megalomastoma tortum of many authors, not of Wood, which equals *Farcimen apertum* Poey.

Shell elongate-ovate, the early whorls varying in color from yellow to pale orange. Nuclear whorls 1.8, well rounded, smooth. Postnuclear whorls well rounded, narrowly shouldered at the summit; the early turns are marked by rather distantly spaced, slender, retractively curved axial riblets. These riblets on the succeeding turns become more closely approximated and less regular, and on the last whorl are less expressed than on the other whorls. In perfect specimens there is a faint indicaton of obsolete spiral hairlines, at least on the early turns. Suture rendered conspicuous by the shoulder at the summit. Base protracted, tapering fairly abruptly toward the open umbilicus. The umbilicus is bounded by an obsolete carina. Within this the umbilical wall appears slightly excavated and is marked by incremental lines. Aperture almost circular; peristome thickened, heaviest at the posterior angle and at the junction of the basal lip with the columella, and narrowest on the parietal wall. Operculum typically farcimenid.

This species is the one that has been considered by many authors to be *F. tortum*. We have explained under that species why we do not agree with this determination. *F.* (*F.*) *pseudotortum* resembles most nearly forms of *F.* (*F.*) *ungula* (Poey), from which, however, it is easily distinguished by the fact that the aperture is not protracted into a clawlike element at the junction of the outer and basal lip.

We are recognizing three subspecies, all occupying parts of Oriente Province, which the following key will help to differentiate:

KEY TO THE SUBSPECIES OF FARCIMEN (FARCIMEN) PSEUDOTORTUM

Umbilicus very narrow.	
Shell large, height more than 24 mm	pseudotortum
Shell small, height less than 20 mm	turquinoense
Umbilicus not very narrow	bayamense

FARCIMEN (FARCIMEN) PSEUDOTORTUM PSEUDOTORTUM, new subspecies

Plate 1, Figures 7–9

This race comes from the ancient Cafetal Buena Vista, 18 miles west-southwest of Bayamo, Oriente Province. The specimen that we have figured is one collected by Gundlach and labeled *M. tortum.* It is distinguished from the other two by its much larger size and the ribbing of the early whorls, which is much more conspicuous and a little more distantly spaced.

The type, U.S.N.M. No. 104424, the specimen referred to above, has 7.5 whorls and measures: Height, 24.9 mm.; greater diameter, 11.8 mm.

FARCIMEN (FARCIMEN) PSEUDOTORTUM TURQUINOENSE, new subspecies

Plate 1, Figures 1–3

This race comes from Pico Turquino, Sierra Maestra, Oriente Province. It is easily distinguished from *F.* (*F.*) *pseudotortum pseudotortum* by its small size, and from *F.* (*F.*) *pseudotortum bayamense* by its strong ribbing.

The type, U.S.N.M. No. 535874, has 5.3 whorls remaining, the tip being broken, and measures: Height, 19.3 mm.; greater diameter, 9.9 mm.

FARCIMEN (FARCIMEN) PSEUDOTORTUM BAYAMENSE, new subspecies

Plate 1, Figures 4–6

This race was collected by Victor Rodriguez at the foot of Pan de Azúcar, Sierra Maestra, southwest of Bayamo. It differs from the other two forms in being much more rotund and much more openly umbilicated and in having considerably finer sculpture. The peristome is also more reflected at the junction of the basal lip and columella.

The type, U.S.N.M. No. 535875, has 6.5 whorls and measures: Height, 18.8 mm.; greater diameter, 10.1 mm.

FARCIMEN (FARCIMEN) YUNQUENSE, new species

Plate 2, Figures 19–21

Shell very small, pale orange, with the last part of the last whorl behind the peristome usually red. Nuclear whorls 2, well rounded, smooth. Postnuclear whorls strongly rounded, narrowly shouldered at the summit and marked by slender, retractively curved axial riblets, which are not equal in strength or regularly disposed. Suture strongly constricted. Periphery well rounded. Base slightly protracted, rather broadly openly umbilicated, and with an obscure angle at the edge of the umbilicus. Aperture circular; peristome expanded, thickened, and double the width of that of the outer lip on the anterior columellar wall and the adjacent basal area, and only about one-half as wide on the posterior columella and parietal side. Operculum typically farcimenid. The species appears restricted to Yunque de Baracoa, Oriente Province.

The type, U.S.N.M. No. 535888, was collected by Arango. It has 6.4 whorls and measures: Height, 17.8 mm.; greater diameter, 9.6 mm.

This species was listed as *Megalomastoma seminudum* by Pfeiffer, Gundlach, and Arango.

FARCIMEN (FARCIMEN) UNGULA (Poey)

In this species the shell varies immensely in shape and color in the different subspecies. The form may be elongate-ovate or elongate-ovate-conic; some individuals are comparatively slender; others, obese. Most of the specimens, having lost their periostracum, are soiled white and they range from this through lemon yellow to rose red. The periostracum is usually thin and translucent. It also varies from wax color to pale wood brown. The umbilicus varies from open to closed. Regardless of what the variance mentioned above may be, the species has in common a thickened peristome, which is protracted into a clawlike element at the junction of the outer and basal lip.

This species is nearest related to *F.* (*F.*) *pseudotortum*, from which its ungulate peristome will readily differentiate it.

The species appears confined to Oriente Province, where we are recognizing nine subspecies, which the following key will help to differentiate.

KEY TO THE SUBSPECIES OF FARCIMEN (FARCIMEN) UNGULA

Umbilicus open.	
Shell large, height more than 26 mm.	
Last whorl orange	semivestitum
Last whorl not orange	holguinense
Shell smaller, height 24 mm. or less	perconvexum
Umbilicus closed.	
Shell very obese.	
Umbilicus bordered with a very conspicuous keel	elephantinum
Umbilicus bordered with an obsolete keel	mirandum
Shell not very obese.	
Whorls well rounded.	
Lip decidedly protracted	ungula
Lip not decidedly protracted	mayariense
Whorls flattish.	
Shell rose colored	mayense
Shell orange	guantanamense

FARCIMEN (FARCIMEN) UNGULA SEMIVESTITUM, new subspecies

PLATE 1, FIGURES 25–27

This race is openly umbilicated. It is much larger than the other member of that group described here, namely, *F.* (*F.*) *ungula holguinense.* The specimens retaining their periostracum show this to be wood brown with an olivaceous tinge, streaked with darker axial lines. When denuded, the last whorl is brilliantly reddish orange. The hairlike axial threads in this race are stronger and the base of the last turn is more attenuated than those of *F.* (*F.*) *ungula holguinense.*

The type, U.S.N.M. No. 535884, from Brazo del Pino, Woodfred, Mayarí, Oriente Province, was collected by I. Rivas. It has 6.5 whorls remaining, having lost the nuclear tip, and measures: Height, 33.0 mm.; greater diameter, 13.8 mm.

FARCIMEN (FARCIMEN) UNGULA HOLGUINENSE, new subspecies

PLATE 1, FIGURES 13–15

The type of this subspecies was collected by García Feria at the Finca de Garcet, Holguín, Oriente Province. We also have specimens collected by Quesada between Cacocum and San Germán, and others obtained by Dr. Aguayo at Báguano, east of Holguín, Oriente Province.

This race shares with *F.* (*F.*) *ungula semivestitum* the open umbilicus. It differs from it in having a much stronger carina limiting the umbilicus and when denuded in not being brilliant orange on the last turn, and in having the axial hairlike riblets finer.

The type, U.S.N.M. No. 535877, has 6.3 whorls remaining and measures: Height, 26.5 mm.; greater diameter, 13.4 mm.

FARCIMEN (FARCIMEN) UNGULA PERCONVEXUM, new subspecies

PLATE 1, FIGURES 10–12

This is a small race, the type of which was collected by Gundlach at Yarayabo, Oriente Province. We also have specimens from Central Palma, Corralillo, northwest of Santiago, from between Baire and Jiguaní, also between Baire and Los Negros, and from San Luis, north of Santiago. Likewise from Manaca, La Plata. While widely distributed, it is fairly constant in form, although the coloration varies materially from flesh colored to roseolate. It is nearest related to *F.* (*F.*) *ungula mayariense*, from which its much smaller size will readily differentiate it.

The type, U.S.N.M. No. 535881, has 5.4 whorls remaining and measures: Height, 24 mm.; greater diameter, 12.5 mm.

FARCIMEN (FARCIMEN) UNGULA ELEPHANTINUM, new subspecies

Plate 2, Figures 13–15

This very obese race was collected by Dr. S. Molina at Loma Santa Fe, Guantánamo, Oriente Province. The only member of the *ungula* complex resembling this is *F.* (*F.*) *ungula mirandum* (Pilsbry), from which its conspicuous tumid umbilical keel distinguishes it. It is also more inclined toward lemon-yellow, instead of being rosy in coloration, and the basal lip is more protracted.

The type, U.S.N.M. No. 535887, has 5.0 whorls remaining and measures: Height, 32.3 mm.; greater diameter, 17.3 mm.

FARCIMEN (FARCIMEN) UNGULA MIRANDUM (Pilsbry)

Plate 2, Figures 16–18

1928. *Megalomastoma ungula mirandum* Pilsbry, Acad. Nat. Sci. Philadelphia Year Book for 1928, p. 17.

This subspecies was collected by Drs. Pilsbry and d'Alté Welch at Central Miranda, between Mayarí and Santiago, Oriente Province. It resembles in obeseness *F.* (*F.*) *ungula elephantinum* but is distinguished by having the shell much more roseolate and the umbilical bounding keel less conspicuous. Also, the lip is not protracted as in that subspecies.

The specimen described and figured, U.S.N.M. No. 464468, a topotype, has 6.0 whorls remaining and measures: Height, 33.0 mm.; greater diameter, 15.9 mm.

FARCIMEN (FARCIMEN) UNGULA UNGULA (Poey)

Plate 1, Figures 28–30

1856. *Megalomastoma ungula* Poey, Memorias sobre la historia natural de la Isla de Cuba, vol. 2, p. 24, pl. 3, figs. 1–4.

The typical race we have from Santiago, Vista Alegre, San Juan Hill and the Pedrito Quarry near Santiago, central Oriente, and the mouth of Magdalena River. The type was collected at Santiago and given to Poey by Dr. Gutierrez.

The subspecies is of medium size, varying in color from pale lemon to very faintly roseolate. It has the peristome decidedly protracted at the junction of the outer and basal lip, giving it a decidedly ungulate appearance. The umbilicus is practically covered by the reflected peristome, the last whorl being materially attenuated, and terminates in a fairly conspicuous carina, marking the outer limit of the umbilicus.

The specimen described and figured, U.S.N.M. No. 104436, is one received from Poey collected at Santiago. It has 6.5 whorls remaining and measures: Height, 29.0 mm.; greatest diameter, 13.2 mm.

It is distinguished from the other forms with closed umbilicus and nonobese shape by having the whorls rounded.

FARCIMEN (FARCIMEN) UNGULA MAYARIENSE, new subspecies

PLATE 1, FIGURES 19–21

This subspecies was collected by J. B. Henderson at the Farallones de Nipe, Piedra Gorda, Canapú, near Cayo del Rey, all places near Mayarí. The type comes from Farallones de Nipe.

The race is most nearly related to *F.* (*F.*) *ungula ungula* (Poey), from which its less protracted aperture and stronger axial sculpture will readily differentiate it.

The type, U.S.N.M. No. 535883, has 7.2 whorls and measures: Height, 28.0 mm.; greater diameter, 14.0 mm.

FARCIMEN (FARCIMEN) UNGULA MAYENSE, new subspecies

PLATE 1, FIGURES 16–18

This race was collected by Dr. Ramsden about Alto Songo, La Maya, Finca Isabelita, and Finca Santa Teresa, Oriente Province. It is a rose-colored race with closed umbilicus and a strong carina bordering it. The whorls are marked by rather strong slightly retractively curved axial riblets, which become weakened on the last turn.

The type, U.S.N.M. No. 535885, from La Maya, has 7.5 whorls remaining and measures: Height, 27.9 mm.; greater diameter, 13.5 mm.

The brilliant rose color will differentiate this easily from the other members with closed umbilicus.

FARCIMEN (FARCIMEN) UNGULA GUANTANAMENSE, new subspecies

PLATE 1, FIGURES 22–24

We have this subspecies from a number of stations ranging about Guantánamo. The individual stations are Vínculo, where the type was obtained, Saltadero, Sierra des Canasta, and Yateras, Oriente Province.

This is an orange-colored race with closed umbilicus. It resembles most nearly *F.* (*F.*) *ungula mayense*, from which its less strong axial sculpture and paler coloration will differentiate it.

The type, U.S.N.M. No. 535886, has 7.4 whorls and measures: Height, 18.6 mm.; greater diameter, 13.8 mm.

FARCIMEN (FARCIMEN) CAMAGUEYANUM, new species

Shell of medium size, elongate-ovate, varying in color from uniformly wax yellow to bicolor, that is, the early whorls may be pale and the last darker, frequently dark chestnut-brown. Nuclear whorls about 1.5, well rounded, smooth. Postnuclear whorls strongly rounded, marked by closely spaced, very slender, almost hairlike, retractively curved axial riblets. Suture well marked. Periphery rounded. Base moderately long, quite openly umbilicated in *F.* (*F.*) *camagueyanum mayajiguense*, a little less so in *F.* (*F.*) *camagueyanum camagueyanum*, and even less so in *F.* (*F.*) *camagueyanum florencianum*, in which the umbilicus is for the greater part concealed. Aperture subcircular; peristome much thickened on the outer, basal, and inner lip, and reflected; the posterior edge of the reflected peristome is sharp. The thickened peristome of the inner lip does not quite reach the preceding turn, but leaves a conspicuous gap. The peristome of the parietal wall is not thickened. Operculum typically farcimenid.

This species ranges through the north and northwestern portion of the Sierra Cubitas and extends to the Jatibonico.

We are recognizing three subspecies, which the following key and descriptions will help to differentiate:

KEY TO THE SUBSPECIES OF FARCIMEN (FARCIMEN) CAMAGUEYANUM

Umbilicus rather broad	mayajiguense
Umbilicus not broad.	
Shell large, height more than 27 mm	camagueyanum
Shell smaller, height less than 25 mm	florencianum

FARCIMEN (FARCIMEN) CAMAGUEYANUM MAYAJIGUENSE, new subspecies

Plate 2, Figures 28–30

We have this race from a number of stations, namely, the north slope of the Sierra de Jatibonico, Veredas de los Broqueles, del Chorrerón y del Alunado, Sierra de Matahambre, and Sierra de Canoa, Mayajigua, Santa Clara Province.

This race has a quite regular convex outline with the early whorls pale olive and the last one much darker, not infrequently purplish. Its chief distinction, however, lies in the fact that the umbilicus is more widely open than in any other race and the bounding keel very conspicuous.

The type, U.S.N.M. No. 535892, comes from the north slope of the Sierra de Jatibonico at Los Broqueles. Having lost the extreme tip, the remaining 6.3 whorls measure: Height, 24.5 mm.; greater diameter, 12.3 mm.

FARCIMEN (FARCIMEN) CAMAGUEYANUM CAMAGUEYANUM, new subspecies

Plate 2, Figures 25–27

This race comes chiefly from the Cubitas Mountains, Camagüey Province. Bartsch collected it at Los Corrales de los Cangilones and at Finca Los Cangilones. Both of these stations are at the foothills of the Cubitas Mountains. In the mountains it was obtained at

Vereda del Burro in several stations on this path. It was also secured in Paso de la Guanaja, in the Paso de las Escaleras, Paso de los Paredones, and Paso de Lesca. In each of these passes series of specimens were taken at various stations.

This is the largest race of the group. It is unicolor and has the umbilicus fairly open, not as wide, however, as in *F.* (*F.*) *camagueyanum mayajiguense.*

The type, U.S.N.M. No. 535893, comes from Los Corrales de los Cangilones. It has 7.1 whorls and measures: Height, 27.4 mm.; greater diameter, 14.5 mm.

FARCIMEN (FARCIMEN) CAMAGUEYANUM FLORENCIANUM, new subspecies

PLATE 2, FIGURES 7–9

This race was collected by Drs. Pilsbry and Welch on the cliffs near Florencia, Camagüey Province. The early whorls in this race are a little darker than in the rest and the last one usually has the purplish tinge of the two-colored forms, which is also the color of the interior. The peristome is decidedly expanded, thickened, and reflected at the junction of the columella and basal lip. It is quite narrow on the parietal wall and leaves exposed a fairly large portion of the umbilicus, thereby displaying the umbilical carina.

The type, U.S.N.M. No. 535894, has 5.0 whorls remaining and measures: Height, 21.3 mm.; greater diameter, 11.0 mm.

FARCIMEN (FARCIMEN) WRIGHTI, new species

Shell rather small, varying from elongate-ovate to ovate in outline. The color ranges from wax yellow through olive to orange, and the shells may be unicolor or bicolor, that is, the last whorl may be chestnut-brown. Nuclear whorls about 1.5, smooth. Postnuclear whorls well rounded, marked by slender, exceedingly fine, closely spaced, hairlike axial riblets. Suture strongly constricted. Periphery well rounded. Base narrowly umbilicated, usually almost hidden by the reflected peristome. Aperture circular; peristome much thickened and reflected on the outer, basal, and columellar portion, much narrower on the parietal wall, where it is somewhat excavated. The broadly expanded portion of the peristome is always sharp and knife-edged at the extreme posterior edge of the reflected part. The peristome of the inner lip touches the preceding turn in *F.* (*F.*) *wrighti biayaense* and *F.* (*F.*) *wrighti wrighti* and almost so in the other two subspecies.

This species ranges through the southern and eastern complex of the Sierras de Guaicanamar and Najaza to Sibanicú to the Lomas de Borje and Santa Cruz, south and east of the Rio Maximo in the Province of Santa Clara.

We are recognizing four subspecies, as follows:

KEY TO THE SUBSPECIES OF FARCIMEN (FARCIMEN) WRIGHTI

Peristome of inner lip almost touching the preceding turn.	
Shell ovate	biayaense
Shell elongate-ovate	wrighti
Peristome of inner lip not touching the preceding turn.	
Umbilical carina conspicuous	martianum
Umbilical carina not conspicuous	najazaense

FARCIMEN (FARCIMEN) WRIGHTI BIAYAENSE, new subspecies

Plate 2, Figures 1–3

This subspecies comes from San Martin de Biaya, 15 miles south of Marti, Camagüey Province. It is a chubby race in which the early whorls are pale olivaceous with the last one tending toward reddish. The interior of the aperture is the color of the exterior of the last whorl. Its chief distinction from the other members consists of the fact that the rather broadly expanded inner lip extends up and almost touches the preceding whorl, leaving a mere line of separation. In this character it agrees with *F.* (*F.*) *wrighti wrighti*, from which it is readily distinguished by its gibbose outline. The parietal wall of the peristome is much narrower than the rest and almost suggests the peculiar lunate aspect of *F.* (*F.*) *bituberculatum* (Sowerby).

The type, U.S.N.M. No. 535889, has 5.1 whorls remaining, the extreme tip being lost, and measures: Height, 22.4 mm.; greater diameter, 13.4 mm. It was collected by Victor Rodriguez.

FARCIMEN (FARCIMEN) WRIGHTI WRIGHTI, new subspecies

Plate 2, Figures 22–24

Bartsch collected this race in large numbers at Loma Santa Cruz, near Senado, Camagüey Province. We have it also from Loma de Borje and between Puerto Príncipe and Tunas, where it was collected by Wright. This subspecies agrees with *F.* (*F.*) *wrighti biayaense* in the approximation of the expanded lip to the preceding turn. It is, however, much slenderer than that race, and its color scheme is much more inclined to bicolor, that is, the early turns wax yellow and the last one purplish brown.

The type, U.S.N.M. No. 535891, comes from Loma Santa Cruz. It has 5.6 whorls remaining, having lost the extreme tip, and measures: Height, 22.7 mm.; greater diameter, 11.8 mm.

Bartsch's field notes say that the animal of this subspecies is pale pink, with numerous very small white dots on the back and sides. The sole of the foot is a little deeper pink than the sides, and the tentacles are coral-red.

FARCIMEN (FARCIMEN) WRIGHTI MARTIANUM, new subspecies

Plate 2, Figures 10–12

We have this race from Finca San Carlos, Marti, which is the type locality, and also from El Zanjón de Sibanicú, and from San Antonio Abad, Berrocal, and Guáimaro, Camagüey Province. This small subspecies is unicolor orange, with white peristome and white umbilical region. The peristome is exceedingly expanded and thickened except at the parietal wall, where it is very narrow and exposes the umbilicus. In general shape it resembles *F.* (*F.*) *wrighti biayaense* but is readily distinguished from that by its smaller size and by having the inner lip decidedly distinct from the preceding turn.

The type, U.S.N.M. No. 535896, which was collected by Victor Rodriguez, has 5.3 whorls remaining and measures: Height, 19.3 mm.; greater diameter, 11.0 mm.

FARCIMEN (FARCIMEN) WRIGHTI NAJAZAENSE, new subspecies

Plate 2, Figures 4–6

The type of this subspecies comes from El Cacaotal de Sifontes, Sierra de Najaza, Camagüey Province. We have it also from the Sierra del Cachimbo, which is between the Sierras del Chorrillo and de Najaza, and from the Sierra de Guaicanamar, Palomar de San José, between Guaicanamar and Najaza, and Verada del Telégrafo in the Sierra del Chorrillo.

This race resembles most nearly *F.* (*F.*) *wrighti martianum* but is easily distinguished from that by the fact that the peristome is decidedly protracted anteriorly.

The type, U.S.N.M. No. 535897, has 6.9 whorls remaining and measures: Height, 21.5 mm.; greater diameter, 13.0 mm.

FARCIMEN (FARCIMEN) BITUBERCULATUM (Sowerby)

In this species the shell varies very much in size; some of the races are of medium stature, while others constitute the largest and most ponderous shells in the genus. In shape they vary from elongate-ovate to elongate-conic. In color also there is a great variation; some races are uniformly pale, others conspicuously bicolor, that is, the last whorl is purplish plum colored, while the early turns are usually of a wax tint. In some races both unicolor and bicolor forms are present. Peristome white with a yellowish tinge. The interior of the aperture ranges from porcelain white to purplish brown but is more or less constant for the different races. Nuclear whorls about 1.5, strongly rounded, smooth. The postnuclear whorls, while rounded, vary materially in convexity in the different races. This is emphasized by the amount of constriction presented by the suture.

The sculpture consists of retractively curved axial riblets that vary materially in number and strength in the different subspecies. All the races show irregularly distributed pitting, which produces an appearance of drilling by some parasite or of partial decay. This character shows a tendency toward approaching *Farcimen* (*Farcimen*) *alutaceum* ([Menke] Pfeiffer), in which it reaches a maximum development. Periphery well rounded. Base well rounded, or somewhat produced, narrowly umbilicated, with or without a limiting umbilical carina. The umbilicus in most races is concealed by the widely expanded and reflected inner peristome. Aperture large, subcircular. Peristome much thickened, expanded, and reflected, except that of the parietal wall, always wider on the columella than the rest, and narrow and somewhat excised on the parietal wall. At the posterior angle of the aperture and at the posterior columellar expansion, the peristome is thickened into more or less of a knob, which furnished the specific name *bituberculatum*. Operculum typically farcimenid.

The species appears confined to the southern part of the Province of Santa Clara, where it reaches its maximum differentiation in the Trinidad Mountain region.

We are recognizing five subspecies:

KEY TO THE SUBSPECIES OF FARCIMEN (FARCIMEN) BITUBERCULATUM

- Whorls strongly rounded.
  - Shell unicolor-- bituberculatum
  - Shell bicolor-- minor
- Whorls not strongly rounded.
  - Axial ribs irregular, interrupted------------------------------ giganteum
  - Axial ribs not irregular or interrupted.
    - Axial riblets strong-- gutierrezi
    - Axial riblets not strong-------------------------------------- crassum

FARCIMEN (FARCIMEN) BITUBERCULATUM BITUBERCULATUM (Sowerby)

PLATE 3, FIGURES 10–12

1850. *Cyclostoma bituberculatum* SOWERBY, Thesaurus Conchyliorum, vol. 1. Suppl., p. 164*, pl. 31a, figs. 290–291.

This race was collected somewhere in the mountains of Trinidad, Santa Clara Province. It differs from all the others in being much slenderer, unicolor, and much more regularly conic, with the whorls strongly rounded, in which respect it resembles *F.* (*F.*) *bituberculatum minor* (Kobelt).

The specimen figured, U.S.N.M. No. 535901, is the only one we have that agrees with Sowerby's figure. It was obtained by Dr. de la Torre from the ancient collection of D. Tomás Iradi in Cienfuegos. It has 4.9 whorls remaining and measures: Height, 32.7 mm.; greater diameter, 17.3 mm.

FARCIMEN (FARCIMEN) BITUBERCULATUM MINOR (Kobelt)

Plate 3, Figures 16–18

1843. *Cyclostoma auriculatum* Sowerby, Thesaurus Conchyliorum, vol. 1, p. 151, pl. 31, fig. 277 (not *Cyclostoma auriculatum* Orbigny, 1842).

1902. *Megalomastoma* (*Farcimen*) *bituberculatum minor* Kobelt, Das Tierreich, Cyclophoridae, p. 265.

This subspecies was collected by H. N. Lowe at Puriales, Santa Rosa, Trinidad, Santa Clara Province. It agrees with the typical race, *F.* (*F.*) *bituberculatum bituberculatum* (Sowerby), in having the whorls strongly rounded but differs from it in being more ovate and in having the last whorl plum colored.

The specimen figured, U.S.N.M. No. 535902, has 5.0 whorls remaining and measures: Height, 28.5 mm.; greater diameter, 15.3 mm.

FARCIMEN (FARCIMEN) BITUBERCULATUM GIGANTEUM, new subspecies

Plate 3, Figures 1–3

We have this subspecies from Sopimpa, a railroad station between Fomento and Trinidad, and Loma del Caballete, Sierra de Gavilanes of the Trinidad region, Santa Clara Province. It differs from the other races of *F.* (*F.*) *bituberculatum* in having the axial ribs of the later turns irregularly developed; in size it resembles *F.* (*F.*) *bituberculatum gutierrezi* and *F.* (*F.*) *bituberculatum crassum*, from both of which the irregularity of its ribs will distinguish it.

The type, U.S.N.M. No. 535904, which comes from Sopimpa, has 5.0 whorls remaining, and measures: Height, 33.7 mm.; greater diameter, 17.8 mm.

FARCIMEN (FARCIMEN) BITUBERCULATUM GUTIERREZI, new subspecies

Plate 3, Figures 4–6

We have this race from a number of stations ranging around Banao, south of Sancti Spíritus and southeast of Trinidad, Santa Clara Province; for example, Finca Angelina, La Quinta, El Cacahual, and Guayacanes; also from Loma de Jarao, Blanquizal, near Guayos.

This is a large pale race, as large as if not larger than *F.* (*F.*) *bituberculatum giganteum*, from which it is easily differentiated by being unicolor. The two races are also zoogeographically distinct.

The type, U.S.N.M. No. 535906, comes from Finca Angelina and has 5.4 whorls remaining. It measures: Height, 36.8 mm.; greater diameter, 18.6 mm.

FARCIMEN (FARCIMEN) BITUBERCULATUM CRASSUM, new subspecies

Plate 3, Figures 13–15

This subspecies comes from the southern mountain complex of Santa Clara Province. We have it from Finca Pitajones, the Caracusey Valley, Trinidad; Loma de Gabino Galvez; Loma Esperanza and Las Damas near Guayos; Finca El Silencio and Cortinas de Veloso, Cantú; Loma Cariblanca, Fomento, Trinidad; and Loma Caja de Agua, Tuinicú, Sancti Spíritus.

This race is large like *F.* (*F.*) *bituberculatum gutierrezi*, which it resembles in many ways but from which it differs by having the peristome very much intensified and in having the axial riblets decidedly reduced, almost obsolete on the last whorl.

The type, U.S.N.M. No. 535907, was collected by Prof. Pedro Guitart at Finca Pitajones, Trinidad. It has 4.6 whorls remaining and measures: Height, 32.8 mm.; greater diameter, 17.8 mm.

FARCIMEN (FARCIMEN) SEMINUDUM (Poey)

Shell varying very greatly in size in the different subspecies. The shape is equally variable, ranging from elongate-turrited to ovate. The early whorls are orange-red, or brownish tinted, or even flesh colored. The last whorl is dark reddish brown with a purplish tinge. Nuclear whorls about 1.5, small, well rounded, smooth. The postnuclear whorls range from well rounded to inflated. The axial sculpture on the early whorls consists of quite regular and regularly spaced riblets. On the last turn these may evanesce or become intensified and irregular. Suture well constricted, rendered conspicuous by the slight shoulder at the summit of the whorls. Periphery well rounded. Base moderately openly umbilicated with a carina of varying strength limiting the umbilicus on the outside. Aperture subcircular; peristome greatly thickened and expanded on the outer, basal, and inner lip, narrow on the parietal portion, thin and sharp at the posterior edge. The peristome is somewhat protracted on the anterior columellar portion. Operculum typically farcimenid.

The species appears limited to Santa Clara Province, whence we are recognizing six subspecies:

KEY TO THE SUBSPECIES OF FARCIMEN (FARCIMEN) SEMINUDUM

- Last whorl almost smooth ---------- magister
- Last whorl not smooth.
  - Axial riblets very fine.
    - Shell large, height more than 27 mm ---------- collare
    - Shell small, height less than 22 mm ---------- poeyi
  - Axial riblets not very fine.
    - Axial ribs of last whorl irregular.
      - Shell ovate ---------- seminudum
      - Shell elongate-ovate ---------- guitarti
    - Axial ribs of last whorl not irregular ---------- leoni

FARCIMEN (FARCIMEN) SEMINUDUM MAGISTER, new subspecies

Plate 4, Figures 19–21

This subspecies comes from the mountains about Trinidad, Santa Clara Province. We have it from Nacimiento del Río Caballero near Letrán and from La Vigía.

It is easily distinguished from the other subspecies by its very large size and much smoother surface, in which respect it approaches *F.* (*F.*) *seminudum poeyi.*

The type, U.S.N.M No. 535914, which comes from Nacimiento del Río Caballero, has 6.4 whorls remaining and measures: Height, 33.0 mm.; greater diameter, 15.4 mm.

FARCIMEN (FARCIMEN) SEMINUDUM COLLARE (Poey MSS.), new subspecies

Plate 4, Figures 7–9

This subspecies is rather widely distributed. It ranges from Corrallilo eastward along the hills of the north coast to the Sierra de Meneses, Santa Clara Province. We have it also from a few scattered places to the south of this range. Through this range we find considerable variation, not so much in size and general shape as in the strength of the peristome and the amount of its reflection over the umbilicus, which is also of variable width, sometimes being quite open. There is likewise considerable variation in the strength of the obsolete angle at the outer limitation of the umbilicus. Any of these characters, if constant, might suggest subspecific distinction, but in the present instance this is precluded because in the large series of specimens before us we find that the variations referred to may be present in any of the population groups examined. Almost 60 lots, most of them representing a considerable series, are before us. The subspecies is much larger than *F.* (*F.*) *seminudum poeyi*, with which it shares the fine axial ribbing.

As a rule, in perfect specimens the early whorls are covered by a thin golden-yellow periostracum; the later whorls are dark, and by far the largest percentage of specimens are bicolor, though unicolor individuals are not rare.

The specimen described and figured, U.S.N.M. No. 535909, comes from La Cantarilla, San Juan de los Yeras, Santa Clara Province. It has 5.5 whorls remaining and measures: Height, 28.6 mm.; greater diameter, 14.7 mm.

FARCIMEN (FARCIMEN) SEMINUDUM POEYI, new subspecies

Plate 4, Figures 25–27

We have this subspecies from Loma de Santa Fé, Camajuani; San Juan de los Remedios, near Santa Clara; Orillas del Río Calabazas, Placetas; Los Damas near Guayos; Central Mapos, west of Sabana, Sancti Spíritus.

This subspecies and *F.* (*F.*) *s. collare* are distinguished from all the others by having very fine, closely spaced axial riblets, which are quite regular on the last turn. It differs from *F.* (*F.*) *s. collare* by its much smaller size.

The type, U.S.N.M. No. 535917, comes from Loma de Santa Fé. It has 6.5 whorls and measures: Height, 20.0 mm.; greater diameter, 11.8 mm.

FARCIMEN (FARCIMEN) SEMINUDUM SEMINUDUM (Poey)

Plate 4, Figures 22–24

1854. *Megalomastoma seminudum* Poey, Memorias sobre la historia natural de la Isla de Cuba, vol. 1, pp. 405–406.

This subspecies comes from the region of Trinidad. We have it from La Vigía, Fomento, and Güinía de Soto, and from Arroyo La Lima, Finca el Retiro, and Cagüeiras in Sancti Spíritus.

This race is small compared with *F.* (*F.*) *seminudum magister*, from which it is also readily distinguished by the irregularity of the axial riblets of the last whorl. It resembles most closely *F.* (*F.*) *seminudum guitarti*, from which it differs in having the shell much more inflated.

The specimen figured, U.S.N.M. No. 535915, is one received from Poey without specific locality. It has 5.0 whorls remaining and measures: Height, 22.8 mm.; greater diameter, 11.7 mm.

FARCIMEN (FARCIMEN) SEMINUDUM GUITARTI, new subspecies

Plate 4, Figures 1–3

This subspecies was collected by Guitart at Finca Caimiabo, Sancti Spiritus. It is a small race, with the axial riblets on the last turn irregularly developed. It resembles most nearly the typical *F.* (*F.*) *seminudum seminudum* (Poey), from which it differs by its smaller size and much less inflated turns.

The type, U.S.N.M. No. 535916, has 5.2 whorls remaining and measures: Height, 21.0 mm.; greater diameter, 10.4 mm.

FARCIMEN (FARCIMEN) SEMINUDUM LEONI, new subspecies

Plate 4, Figures 16–18

This subspecies was collected by Hermano León and Professor Guitart at Hornos de Cal, Vista Alegre, Sancti Spíritus, Santa Clara Province. It is a little smaller than *F.* (*F.*) *seminudum magister* and has the axial ribs more strongly developed. It is much larger than the other three subspecies here listed, differing also from *F.* (*F.*) *seminudum poeyi* in having the axial ribs stronger and from the other two smaller races in having them regular on the last whorl.

The type, U.S.N.M. No. 535903, has 4.5 whorls remaining and measures: Height, 25.4 mm.; greater diameter, 14.0 mm.

FARCIMEN (FARCIMEN) TORREI (Guitart)

Plate 6, Figures 4–6

1936. *Megalomastoma torrei* Guitart, Mem. Soc. Cubana Hist. Nat. "Felipe Poey," 1936, pp. 105–106, figs. 1, 2.

Shell very small, elongate-ovate. The early whorls are wax yellow with an orange flush, the last one being darker. The nuclear whorls are decollated. Postnuclear whorls rather well rounded, marked by slender, almost hairlike, slightly retractively curved axial riblets which are about one-third as wide as the spaces that separate them. These riblets become a little more distantly spaced on the last whorl. Suture well constricted. Periphery well rounded. Base slightly protracted, openly, moderately broadly umbilicated, the umbilical angle marked by an obsolete cord. Aperture circular; peristome thickened, except on the parietal wall, where it is much thinner. Operculum typically farcimenid.

The specimens in our collection are paratypes received from Guitart and were collected on the banks of the Río Manajanabo. The specimen described and figured, U.S.N.M. No. 535918, has 4.5 whorls remaining and measures: Height, 16.9 mm.; greater diameter, 8.4 mm.

FARCIMEN (FARCIMEN) OBESUM, new species

Shell varying from medium size to large, pale chestnut-brown, with the peristome pale yellow. The nucleus consists of a little more than one turn, which is well rounded and smooth. Postnuclear whorls rather inflated, moderately well rounded, marked by almost vertical, gently curved axial riblets which are about as wide as the spaces that separate them. Suture well impressed. Periphery well rounded. Base rather openly umbilicated with an obtuse carina marking the outer edge of the umbilicus. The umbilical wall is marked by the continuation of the axial riblets. Aperture circular, oblique, decidedly expanded; the peristome is broadly expanded, reflected, and decidedly thickened, somewhat auriculated at the posterior angle and also at the posterior portion of the inner lip, which does not touch the preceding turn. Operculum typically farcimenid.

This species occupies the northeastern mountains of Santa Clara Province.

We are recognizing two subspecies, which the following key and descriptions will help to differentiate:

KEY TO THE SUBSPECIES OF FARCIMEN (FARCIMEN) OBESUM

Diameter more than 17 mm	obesum
Diameter less than 15 mm	subobesum

FARCIMEN (FARCIMEN) OBESUM OBESUM, new subspecies

PLATE 3, FIGURES 7–9

This race was collected by Bartsch on Loma Platero. It is much more gibbose than the smaller eastern race, *F.* (*F.*) *o. subobesum.* We have also seen specimens of it from Seibado de Yaguajay and from El Resbalillo, Cambao, Yaguajay, and Remedios.

The type, U.S.N.M. No. 535908, comes from Loma Platero. It has 4.5 whorls remaining and measures: Height, 31.4 mm.; greater diameter, 18.6 mm.

Bartsch described the animal of specimens collected on Loma Platero as being of a general pale pink tone with buffish snout. The whole body except the sole of the foot is covered with small flattened tubercles, which are marked by numerous fine white dots. Tentacles bright coral-red. Sole of foot pale pink.

FARCIMEN (FARCIMEN) OBESUM SUBOBESUM, new subspecies

PLATE 3, FIGURES 19–21

This race ranges through the mogotes about Remedios and Yaguajay. We have it from the Dos Sierras, Central San Agustín; Caicaje, Loma de Bueno Vista and the north slope of the Sierra de Meneses east of Yaguajay, also opposite Jungalito. It can be easily distinguished from typical *F.* (*F.*) *obesum obesum* by its much smaller size and less gibbose form.

The type, U.S.N.M. No. 516710, comes from the paredónes on the north side of the second mogote west of the gap in the Dos Sierras, Santa Clara Province. It has 6 whorls remaining and measures: Height, 28.1 mm.; greater diameter, 14.5 mm.

The specimens collected by Bartsch at the Central San Agustín and in the Sierra de Jatibonico, opposite Los Broquelles, were described by him as having the entire animal flesh colored with a rosy flush, with the tentacles bright coral-red. The papillae of the sides with numerous white dots.

FARCIMEN (FARCIMEN) ALUTACEUM ([Menke] Pfeiffer)

Shell elongate-ovate, varying very greatly in size in the different subspecies. The early whorls are wax yellow; this changes to dull orange on the succeeding turns and finally to dull reddish brown, or dull plum purple on the last whorl. Peristome white with a yellow tinge. Interior of the aperture reddish brown. Nuclear whorls almost 2, strongly rounded, smooth. Postnuclear whorls strongly rounded, the first marked by more or less regular, retractively slanting axial riblets which on the succeeding whorls break up into shorter elements to form a very complex and irregular network of meshes, between which deep pits are present. The pittings rather than the meshes that enclose them catch one's eye. Suture deeply constricted. Periphery well rounded. Base somewhat produced, openly umbilicated, with the edge of the umbilicus more or less carinated, not pitted. Umbilical wall marked by lines of growth only. Aperture oval with the long axis oblique to that of the spire. Peristome decidedly expanded, thickened, and reflected, excepting the parietal portion, widest on the columella, more or less alate at the posterior part of the columella and outer lip. Operculum typically farcimenid.

This species is confined to the Trinidad Mountain complex of southern Santa Clara Province.

KEY TO THE SUBSPECIES OF FARCIMEN (FARCIMEN) ALUTACEUM

Shell large, height about 30 mm	magnificum
Shell medium sized, height about 25 mm	alutaceum
Shell small, height about 17 mm	digitale

FARCIMEN (FARCIMEN) ALUTACEUM MAGNIFICUM, new subspecies

Plate 4, Figures 13–15

This subspecies occurs at Sopimpa, Santa Clara Province. The shell of this race is very large, agreeing in shape and sculpture with *F.* (*F.*) *alutaceum alutaceum* ([Menke] Pfeiffer) and *F.* (*F.*) *alutaceum digitale* (Gundlach), from which it differs by a little weaker pitting on the last turn and by its gigantic size.

The type, U.S.N.M. No. 535898, has 5.3 whorls remaining and measures: Height, 30.3 mm.; greater diameter, 15.4 mm.

FARCIMEN (FARCIMEN) ALUTACEUM ALUTACEUM ([Menke] Pfeiffer)

Plate 4, Figures 10–12

1846. *Cyclostoma alutaceum* (Menke) Pfeiffer, Zeitschr. Malak., vol. 3, pp. 85–86.

We have this typical race from Quemado Feo, north of Trinidad. It is intermediate in size between *F.* (*F.*) *alutaceum magnificum* and *F.* (*F.*) *alutaceum digitale* (Gundlach). It has the whorls a little less convex.

The specimen described and figured, U.S.N.M. No. 535899, has 4.5 whorls remaining and measures: Height, 25.1 mm.; greater diameter, 13.3 mm.

FARCIMEN (FARCIMEN) ALUTACEUM DIGITALE (Gundlach)

Plate 4, Figures 4–6

1857. *Megalomastoma digitale* Gundlach, Malak. Blätter, vol. 4, p. 114.

We have this small race from Letrán and Puriales in Trinidad; Soledad near Cienfuegos; Ternero; and Sierra de San Juan, Santa Clara Province. The small size of this subspecies will easily differentiate it from the rest.

The specimen described and figured, U.S.N.M. No. 535900, comes from Letrán and has 5 whorls remaining. It measures: Height, 16.4 mm.; greater diameter, 10.1 mm.

FARCIMEN (FARCIMEN) ROCAI, new species

Plate 5, Figures 13–15

Shell of medium size, the early whorls pale yellowish, the last chestnut-brown; peristome yellowish white. The nucleus consists of a little more than one well-rounded smooth turn. The postnuclear whorls are well rounded and marked by irregular, slightly retractively curved, somewhat sinuous, poorly developed axial riblets, which branch and anastomose in an irregular manner. In addition to this there are fine irregular pittings suggesting those of *F.* (*F.*) *alutaceum* ([Menke] Pfeiffer). Suture well constricted. Periphery well rounded. Base sloping suddenly toward the obsolete carina that marks the outer edge of the open umbilicus. The umbilical wall is marked by the continuation of the incremental lines. Aperture circular; peristome double, the outer decidedly expanded, thin at the edge, concave, turned up into conspicuous auricles at the posterior angle and at the posterior termination of the outer peristome of the inner lip. It is very narrow on the parietal wall, touching the preceding whorl only in the middle. Operculum typically farcimenid.

The type, U. S. N. M. No. 535905, was collected by Father Roca at Cabezadas del Caracusey, which is between Trinidad and Sancti Spíritus, Santa Clara Province. It has 5.4 whorls remaining and measures: Height, 17.0 mm.; greater diameter, 15.8 mm.

The irregular sculpture and "worm-eaten" pittings suggest a close affinity with *F.* (*F.*) *alutaceum*, from which it can readily be distinguished by the sharp-edged outer peristome, which lacks the heavy thickening characteristic of *F.* (*F.*) *alutaceum*. Prof. P. Guitart has also collected specimens of this at Cortinas de Corengue and Veguetas de Buenos Aires.

FARCIMEN (FARCIMEN) AURICULATUM (Orbigny)

Moderately large shells of very elongate-ovate outline. Early whorls flesh colored or orange in one race; the last or last two whorls purplish brown. Nuclear whorls about 1.3, small, well rounded, smooth. Postnuclear whorls well rounded, appressed at the summit, marked by fairly regularly developed, slender, retractively curved axial riblets, which on the last whorl are almost sigmoid; these riblets are narrower than the spaces that separate them. In addition to this, the whorls show distantly, irregularly distributed, small, round pits suggestive of *F.* (*F.*) *alutaceum* ([Menke] Pfeiffer). Suture moderately constricted. Periphery well rounded. Base slightly protracted, moderately openly umbilicated and marked like the spire. Aperture subcircular; peristome broadly expanded, except that of the parietal wall, much thickened, with the posterior edge of the reflection of the outer lip sharp. The peristome of the inner lip is decidedly produced, which lends to the aperture an earlike appearance, hence the name. It does not approach the preceding whorl but is separated from it by a large gap. A knoblike thickening may be present at the posterior termination of the peristome of both the inner and outer lip. Operculum typically farcimenid.

We are recognizing four subspecies, three of which appear confined to the southwest side of Santa Clara and southeast of Matanzas Provinces, while the fourth stretches from the north coast at Cardenas southward to Coliseo and San Miguel.

KEY TO THE SUBSPECIES OF FARCIMEN (FARCIMEN) AURICULATUM

Peristome very much thickened ---------- senectum
Peristome not very much thickened.
    Early whorls orange ---------- clenchi
    Early whorls pale.
        Shell large, height more than 29 mm ---------- bicolor
        Shell smaller, height less than 26 mm ---------- auriculatum

FARCIMEN (FARCIMEN) AURICULATUM SENECTUM, new subspecies

PLATE 5, FIGURES 16–18

Two specimens from Cayo Carenas, near Cienfuegos, collected by Henderson appear to be semifossil. They differ very greatly from the other subspecies in having the peristome enormously thickened and decidedly effused on the columellar side.

The type, U.S.N.M. No. 535911, has 5 whorls remaining and measures: Height, 26.5 mm.; greater diameter, 14.1 mm.

FARCIMEN (FARCIMEN) AURICULATUM CLENCHI, new subspecies

Plate 5, Figures 7–9

We have this subspecies from Colonia Guabairo, Central Soledad, Cienfuegos; and Hatiguanico, Cabo Zapata, Santa Clara Province. It is much larger than the typical *F.* (*F.*) *auriculatum auriculatum* (Orbigny) and much darker in coloration, the early whorls usually being deep orange or the next to the last rosy and the last plum colored.

The type, U.S.N.M. No. 535913, comes from Guabairo. It has 5.3 whorls remaining and measures: Height, 30.0 mm.; greater diameter, 14.7 mm.

FARCIMEN (FARCIMEN) AURICULATUM BICOLOR (Gould)

Plate 5, Figures 19–21

1844. *Cyclostoma auriculatum bicolor* Gould, Boston Journ. Nat. Hist., vol. 4, cover p. 494.

This race centers around Coliseo; we have it also from Los Chivos, Cimarrones, near Cárdenas, Matanzas Province. It resembles most nearly the typical race in shape, sculpture, and coloration, also in the shape of the aperture, but it is uniformly larger.

The specimen figured, U.S.N.M. No. 535912, was collected by Bartsch on the steep paredónes west of the pass at Coliseo. It has 7.8 whorls remaining and measures: Height, 30.3 mm.; greater diameter, 14.0 mm.

FARCIMEN (FARCIMEN) AURICULATUM AURICULATUM (Orbigny)

Plate 5, Figures 1–3

1842. *Cyclostoma auriculatum* Orbigny, *in* Sagra's Histoire physique, politique et naturelle de l'Ile de Cuba, vol. 1, p. 257, pl. 22, figs. 1, 2.

1851. *Cyclostoma solenatum* Poey, Memorias sobre la historia natural de la Isla de Cuba, vol. 1, pl. 7, figs. 17, 18.

1852. *Cyclostoma idolum* (Férussac MS.) Pfeiffer, Monographia pneumonopomorum viventium, vol. 1, p. 130.

We have seen this subspecies from the following localities: Zarabanda and Yaguaramas, Santa Clara Province. It differs from *F.* (*F.*) *auriculatum bicolor* (Gould), with which it agrees most closely, in the shape of the aperture and in being much smaller; it is less dark in color than *F.* (*F.*) *auriculatum clenchi.*

The specimen figured, U.S.N.M. No. 535910, which comes from Zarabanda, has 6.0 whorls remaining and measures: Height, 25.0 mm.; greater diameter, 12.7 mm.

FARCIMEN (FARCIMEN) TORTUM (Wood)

Plate 5, Figures 10–12, 22–24

1828. *Turbo tortus* Wood, Index testaceologicus, ed. 2, Suppl., p. 20, fig. 32.
1828. *Cyclostoma tortum* Wood, *ibid.*, p. 36, pl. 6, fig. 32.
1851. *Cyclostoma apertum* Poey. Memorias sobre la historia natural de la Isla de Cuba, vol. 1, pl. 7, figs. 15, 16.
1854. *Megalomastoma apertum* Poey, *ibid.*, p. 405.

Shell of medium size, elongate-ovate. Early whorls wax yellow, turning to brown on the last turn. Peristome white. Nuclear whorls 1.7, well rounded, smooth. Postnuclear whorls strongly rounded, the early ones marked by very regular, very closely spaced, hairlike axial riblets, which evanesce on the last turn. Faint indications of spiral lirations are also present. Suture strongly constricted, rendered conspicuous by the very narrowly shouldered summit of the whorls. The last whorl is rather long, bounded anteriorly by a low rounded carina, which marks the outer edge of the moderately broad open umbilicus. The umbilical wall is marked by axial threads, which are stronger here than on the outside of the last turn. Aperture oblique, subcircular; peristome very much thickened, reflected, narrower on the parietal wall and the columella. Operculum typically farcimenid.

The two specimens figured, U.S.N.M. No. 516857, came from Los Palos, Nueva Paz, Habana Province. They were collected by Arango. One, a complete specimen, has 6.5 whorls; the other has 5.2 whorls remaining. They measure, respectively: Height, 27.0, 23.5 mm.; greater diameter, 14.0, 13.9 mm.

There are 38 lots in the collection of the United States National Museum, all of which fall within the range mentioned above.

Wood's small figure has caused endless confusion. Most authors believed that it represented what we are here calling *Farcimen pseudotortum*, which occupies a region of eastern Cuba that was not explored in 1828. The aperture as figured by Wood is not quite normal for *F. apertum* Poey, a common species in Habana Province, but specimens with the characters here depicted are not infrequent. The swollen, overhanging middle whorl is also of not infrequent occurrence in *F. apertum* Poey, all of which leads us to believe that *F. tortum* is without question *Farcimen apertum* Poey, which name it must replace.

In 1851 Poey (*loc. cit.*) gave two figures of what he called *Cyclostoma apertum.* Evidently through correspondence with Pfeiffer he was led to believe that his figures represented a variety of *F. auriculatum*, for in 1854 (*loc. cit.*) he states that the figures were bad. Here he gives a description of the shell and cites the south coast of Cuba as the home of the species. He also mentiones the ingenio (sugar mill) of Don J. Poey near Alacranes as a source of some of his material.

We believe that Poey's figures are not at all bad, that they represent quite well the species that occurs abundantly between Habana and Matanzas. Many specimens distributed by Poey with the name *Megalomastoma apertum* belong to this species and add additional support to our conclusion. Also, Gundlach, in Pfeiffer (Malakozool. Blätter, vol. 3, p. 122, 1856), describes the animal of *Megalomastoma apertum* and cites therewith Loma de Camoa as the first definite locality for the species, which we shall consider the restricted type designation. A translation of Gundlach's description of the animal is as follows:

Animal beautiful rose-red with coral-red antennae, small black eyes on the outer bases of the short antennae. In moving about the head is projected very slowly about two lines beyond the shell and the shell is then rapidly drawn after it. The caudal portion does not project beyond the operculum.

FARCIMEN (FARCIMEN) GUNDLACHI (Pfeiffer)

Medium-sized shells with the early whorls wax color or a little dusky; the later turns considerably darker, in some cases even plum colored. Nuclear whorls small, a little more than 2, well rounded, smooth. Postnuclear whorls inflated, rather strongly rounded, marked by mere incremental lines or slender riblets, which vanish on the middle of the turns and are most emphasized on the posterior portion. There are faint indications of spiral hair lines. These may be mere color markings. Suture moderately well constricted. Periphery well rounded. Base protracted, openly umbilicated with a strongly rounded carina marking the outer limit of the umbilicus. Aperture almost circular; peristome broadly expanded and reflected except on the inner lip, which is narrower and adnate to the preceding turn. Operculum typically farcimenid.

The species is confined to the eastern end of Pinar del Río and the western part of Habana Provinces where three races are recognizable.

KEY TO THE SUBSPECIES OF FARCIMEN (FARCIMEN) GUNDLACHI

Axial riblets obsolete	gundlachi
Axial riblets not obsolete.	
Shell small, height less than 20 mm	gundlachiellum
Shell larger, height more than 22 mm	anafense

FARCIMEN (FARCIMEN) GUNDLACHI GUNDLACHI (Pfeiffer)

PLATE 6, FIGURES 22–24

1856. *Megalomastoma gundlachi* PFEIFFER, Malak. Blätter, vol. 3, pp. 48, 121.
1857. *Megalomastoma gundlachi* PFEIFFER, Nov. Conch., vol. 1, p. 96, pl. 26, figs. 20–22.

Henderson and Bartsch collected this subspecies at various places in the Cuzco Mountain complex. For example, El Mulo; the upper reaches of the Río Hondo; Peña Blanca (El Huro); Lomas de Cuzco; and Salto de Manantiales. The typical subspecies is remarkably smooth, with scarcely any indication of riblets at the summit, in which respect it differs from *F.* (*F.*) *gundlachi gundlachiellum*, which has slight ribbing on the posterior half of the turns.

The specimen figured, U.S.N.M. No. 535920, comes from Loma del Cuzco (El Mulo). It has 7.0 whorls and measures: Height, 24.3 mm.; greater diameter, 11.0 mm.

FARCIMEN (FARCIMEN) GUNDLACHI GUNDLACHIELLUM, new subspecies

PLATE 6, FIGURES 1–3

We have this small race from the mountains north of Candelaria, such as El Taburete, Cayajabos, and Mogote Soton. Its smaller size will readily distinguish it from the other two subspecies.

The type, U.S.N.M. No. 535924, coming from El Taburete, Cayajabos, has 5.1 whorls remaining and measures: Height, 19.6 mm.; greater diameter, 10.8 mm.

Bartsch describes the animal of this subspecies, which he collected at Soton on a hillside west of Taburete, June 11, 1928, as follows: Animal flesh colored with a pinkish suffusion. The tentacles in some specimens are a trifle pinker than the general tone of the body; in others they are coral-red. Eyes black, situated at the outer base of the tentacles.

FARCIMEN (FARCIMEN) GUNDLACHI ANAFENSE, new subspecies

PLATE 6, FIGURES 25–27

This subspecies appears to be restricted to the Sierra de Anafe. We have a lot from Guanajay, Pinar del Río Province, however, which agrees in every way with it. It resembles most nearly the typical race but is easily distinguished from that by having the axial ribs of the early whorls much finer and more closely spaced. The last whorl is also smoother.

The type, U.S.N.M. No. 535923, comes from Loma de Anafe. It has 7.0 whorls and measures: Height, 22.3 mm.; greater diameter, 11.0 mm.

FARCIMEN (FARCIMEN) LEONINUM (Pfeiffer)

Shell varying from small to medium sized, elongate-ovate, usually wax yellow or with the last whorl much darker, even plum colored. Nuclear whorls about 2, quite small, well rounded, smooth. Postnuclear whorls somewhat inflated, well rounded, marked by slightly sinuous axial riblets, which vary materially in spacing and development in the two races here recognized. Suture moderately constricted. Periphery well rounded. Base protracted, marked by an obsolete carina at the junction with the umbilicus, which is moderately open. Aperture subcircular; peristome thickened and reflected, fairly uniform in size excepting that of the parietal wall, which is much narrower and adnate to the preceding turn. Operculum typically farcimenid.

The species is confined to the central part of Pinar del Río Province. We are recognizing two subspecies, which the following key will help to differentiate:

KEY TO SUBSPECIES OF FARCIMEN (FARCIMEN) LEONINUM

Shell large, height more than 24 mm________________________________ leoninum
Shell small, height less than 21 mm________________________________ leonellum

FARCIMEN (FARCIMEN) LEONINUM LEONINUM (Pfeiffer)

Plate 5, Figures 25–27

1856. *Megalomastoma leoninum* Pfeiffer, Malak. Blätter, vol. 3, pp. 48, 122.
1857. *Megalomastoma leoninum* Pfeiffer, Nov. Conch., vol. 1, p. 97, pl. 26, figs. 23–25.

This medium-sized race comes from the higher reaches about Rangel. The axial ribs are comparatively strong and rather distantly spaced, particularly upon the early whorls. Its larger size will easily differentiate this subspecies from *F.* (*F.*) *leoninum leonellum.*

The specimen figured, U.S.N.M. No. 535922, comes from the coffee plantation on the summit of Rangel. It has 5.4 whorls remaining and measures: Height, 25.0 mm.; greater diameter, 12.5 mm.

FARCIMEN (FARCIMEN) LEONINUM LEONELLUM, new subspecies

Plate 5, Figures 4–6

We have this subspecies from San José, Rangel; Sierra de Limones, and also from a station on the road between Rangel and Guajaibón. It differs from the typical race in being considerably smaller and darker colored and in having the anterior portion of the whorls only slightly ribbed.

The type, U.S.N.M. No. 535921, which comes from San José, Rangel, has 5.4 whorls remaining and measures: Height, 20.3 mm.; greater diameter, 10.3 mm.

FARCIMEN (FARCIMEN) MANI (Poey)

PLATE 6, FIGURES 16–18

1851. *Cyclostoma mani* POEY, Memorias sobre la historia natural de la Isla de Cuba, vol. 1, pl. 7, figs. 19–22.
1854. *Megalomastoma mani* POEY, *ibid.*, pp. 404–405.

Shell moderately large, elongate-ovate, wax colored throughout, or with the last whorl brownish or even purplish. Peristome pale yellow. Nuclear whorls about 1.7, small, well rounded, smooth. Postnuclear whorls inflated, strongly rounded, and marked on the early turns by closely spaced, slender axial riblets, which are as fine as hairs. On the middle whorl these become quite reduced and on the later ones obsolete. Suture rather strongly constricted. Periphery well rounded. Base slightly protracted, narrowly umbilicated, with an obsolete carina marking the outer edge of the umbilicus. Aperture subcircular; peristome broadly expanded, particularly so on the inner lip, where it is decidedly produced, a little narrower on the parietal wall, where it is adnate to the preceding turn.

The specimen described and figured, a topotype, U.S.N.M. No. 535925, was received from Poey. It has 7.3 whorls remaining and measures: Height, 26.1 mm.; greater diameter, 13.5 mm.

This species comes from the general region of Rangel and the Santa Cruz River, and extends northward to Rancho Lucas in the Mount Guajaibón region.

FARCIMEN (FARCIMEN) VENTRICOSUM (Orbigny)

PLATE 6, FIGURES 13–15

1842. *Cyclostoma ventricosa* ORBIGNY, *in* Sagra's Histoire physique, politique et naturelle de l'Ile de Cuba, vol. 1, p. 256, pl. 21, fig. 13.

Shell ovate, decidedly inflated, pale orange. Nuclear whorls 1.5, small, well rounded, smooth. The postnuclear whorls increase very rapidly, inflated, strongly rounded and marked on the early whorls by fine, almost hairlike, retractively curved axial riblets, which on the first turn are very distantly spaced, while on the succeeding turns they become decidedly closely approximated, being separated on the second turn by spaces about as wide as the riblets. On the last three turns they are obsolete or rather replaced by irregular and irregularly distributed incremental lines. The summit of the whorls is slightly narrowly shouldered, which renders the suture rather conspicuous. Periphery inflated, strongly rounded. Base short, well rounded, with a rounded carina marking the outer edge of the open umbilicus. Aperture almost circular; peristome rather broadly expanded, thickened, and marked by concentric lines of growth of about equal width, except that of the parietal wall, which is much narrower. Operculum typically farcimenid.

This species is restricted to Pan de Guajaibón, where it is very abundant about Hato Sagua. The specimen described and figured, U.S.N.M. No. 535928, is one of a large series collected by Henderson and Bartsch. It has 7.3 whorls and measures: Height, 29.3 mm.; greater diameter, 17.2 mm.

This species is easily distinguished from all other Farcimens by its stout, short, decidedly inflated form.

FARCIMEN (FARCIMEN) SUBVENTRICOSUM, new species

Shell varying greatly in form in the different subspecies; in some it is elongate-ovoid; in others, elongate-conic. In color the shells vary from soiled wax color to pale orange to pale brown; they may be unicolor or darker on the later turns, and the last may even be purplish plum colored. Nuclear whorls almost 2, small, well rounded, smooth. Postnuclear whorls inflated, strongly rounded. In one subspecies they are marked by rather strong, well-defined axial ribs on all but the last turn. In others, the axial riblets are in the form of hair lines on the early turns, evanescing shortly thereafter. Suture constricted to a varying degree in the different races. Periphery well rounded. Base moderately produced in all the races, moderately broadly openly umbilicated with a rounded carina at the outer limit of the umbilicus. Aperture subcircular; peristome moderately expanded, decidedly thickened and reflected, protracted on the columellar wall and decidedly narrowed on the parietal wall and marked by concentric lines of growth. Operculum typically farcimenid.

This species ranges from the Río San Diego north of San Diego de los Baños, through the Organos Mountains to Pan de Guajaibón, through the Sierra Chiquita, west through the Sierra de Galalón and Sierra de Pico Chico; the Sierra de San Andrés to Viñales.

We are recognizing three subspecies, which the following key will help to distinguish:

KEY TO SUBSPECIES OF FARCIMEN (FARCIMEN) SUBVENTRICOSUM

Axial riblets rather strong	multistriatinum
Axial riblets not strong.	
Shell slender	balneorum
Shell stout	subventricosum

FARCIMEN (FARCIMEN) SUBVENTRICOSUM MULTISTRIATINUM, new subspecies

Plate 6, Figures 19–21

This race appears to extend from Los Lagunitas, near the Sierra de Galalón to San José and to certain of the mogotes of the San Diego de los Baños complex. It is easily differentiated from the others by having rather strong regular axial riblets on all but the last whorl.

The type, U.S.N.M. No. 535934, comes from Los Lagunitas. It has 6.2 whorls remaining and measures: Height, 31.5 mm.; greater diameter, 15.8 mm.

FARCIMEN (FARCIMEN) SUBVENTRICOSUM BALNEORUM, new subspecies

Plate 6, Figures 10–12

This race occupies the mogotes and mountainsides bordering the Río San Diego, north of San Diego de los Baños, apparently on both sides of the river. It is a smaller and slenderer race than *F.* (*F.*) *subventricosum multistriatinum.* It also has the ribbing merely indicated.

The type, U.S.N.M. No. 535935, comes from the Cueva de los Indios on the east bank of the Río San Diego. It has 8 whorls and measures: Height, 28.2 mm.; greater diameter, 12.8 mm.

FARCIMEN (FARCIMEN) SUBVENTRICOSUM SUBVENTRICOSUM, new subspecies

Plate 6, Figures 7–9

This subspecies extends from Pan de Guajaibón westward through the Organos Mountains to Viñales. It is a subventricose race whose whorls are narrowly shouldered at the summit and whose axial sculpture is reduced to mere lines of growth. It somewhat suggests *F.* (*F.*) *ventricosum* (Orbigny), but is easily distinguished from that species by its less inflated form. It differs from the other subspecies by its more inflated form and less strong sculpture.

The type, U.S.N.M. No. 535933, comes from the northeast end of Pan de Guajaibón. It has 6.5 whorls remaining and measures: Height, 30.3 mm.; greater diameter, 15.7 mm.

FARCIMEN (FARCIMEN) VINALENSE, new species

Shell elongate-conic, varying materially in outline, unicolor, wax colored or pale orange or with the last whorl much darker, even plum colored; peristome white or pale yellow. Nuclear whorls two, well rounded, smooth. The early postnuclear whorls are marked by slender, rather feebly developed axial threads, which vary materially in spacing in the two subspecies. The succeeding whorls are inflated, strongly rounded and marked by less strong threads, which gradually grow weaker and evanesce on the last whorl. Suture strongly constricted. Base moderately prolonged, bounded by a rounded carina at the junction with the open umbilicus. Aperture almost circular; peristome broadly expanded, thickened, and reflected, broadest on the columellar wall where it is protracted, narrowest on the parietal wall; peristome is marked by concentric lines of growth. Operculum typically farcimenid.

We are recognizing two subspecies. which the following key will help to differentiate:

KEY TO SUBSPECIES OF FARCIMEN (FARCIMEN) VINALENSE

Shell elongate	vinalense
Shell not elongate	scopulorum

FARCIMEN (FARCIMEN) VINALENSE VINALENSE, new subspecies

Plate 7, Figures 4–6

This subspecies ranges about the region of Viñales. We have it from the Ensenada de los Baños; the valley east of Baños de San Vicente; Cueva de las Delicias, Sierra de Viñales; the paredón of the Puerta del Ancón; Sierra de la Chorrera and Hoyo de Jaruco. It is a decidedly narrow race, of almost cylindric outline, with very rounded whorls, which readily distinguish it from the more regularly conic *F.* (*F.*) *vinalense scopulorum.*

The type, U.S.N.M. No. 535929, comes from the Ensenada de los Baños. It has 8 whorls and measures: Height, 28.8 mm.; greater diameter, 14.1 mm.

FARCIMEN (FARCIMEN) VINALENSE SCOPULORUM, new subspecies

Plate 7, Figures 7–9

We have this subspecies from the mogotes around Kilometer 14 between Pinar del Río and Viñales, also from the mogotes adjacent to the road between Viñales and the Puerta del Ancón, for example: The Mogotes de la Vega, Capón, Coco Solo, Puertecitas, Trujillo, Palmarito, Zacarias, Dinamita, Rojas, Cuajaní, Rinconada, and Vigil. This race differs from typical *F.* (*F.*) *vinalense vinalense* in being smaller, less elongated, more conic, and stouter and in having the whorls slightly less rounded.

The type, U.S.N.M. No. 535930, comes from the mogote on the northeast side of the road at Kilometer 14, between Pinar del Río and Viñales. It has 8 whorls and measures: Height, 27.3 mm.; greater diameter 14.4 mm.

Dr. Joseph P. E. Morrison has dissected specimens of this subspecies and has furnished us with the following description based upon alcoholic material, No. 6674, collected by Bartsch on Mogote de la Dinamita.

The foot is short, oval, with undivided sole. The snout is of medium length, tapering, conical, truncate at the tip. The tentacles are short, slightly tapering, but blunt at their tips. The eyes are small, borne on slight prominences at the outer base of the tentacles.

The verge is conspicuous in male individuals. It is attached on the side of the neck, lateral to the right tentacle, and furnished only with a seminal groove. The verge is basally somewhat flattened, and a little swollen in appearance, gradually tapered to a subcylindrical glandular portion near the tip. The seminal groove begins at the opening of the vas deferens and extends diagonally across the body surface to the posterior basal point of attachment of the verge, and continues on the under or posterior side of the verge, to the narrowly rounded tip. Ordinarily the terminal part of the verge is looped or folded upon itself, along the side of the foot.

The jaw is composed of two triangular pieces hinged together dorsally. The median edge of each jaw is thickened into an obscure ridge which projects as a distinct cutting point, on the free edge of the jaw. The surface of the jaw is marked with diagonal striations (or rows of diamond-shaped scalelike elements); running nearly forward at the median line, these extend over the ridge, where they gradually change direction, to extend diagonally to the cutting edge.

The radula has the characteristic formula of the family Cyclophoridae. The central is tricuspid, much higher than wide. The lateral is tricuspid, oblique, the central cusp much larger than the other two. The inner marginal is somewhat oblique, and bears three cusps, the middle one twice as long as the two smaller ones. The shorter, outer marginal tooth bears only two subequal cusps on its cutting edge.

The reduction of cusps to two on the outer marginal tooth appears to be characteristic of the genus *Farcimen.*

FARCIMEN (FARCIMEN) SUPERBUM, new species

Shell large, rather stout, very elongate-ovate. Early whorls wax yellow, gradually turning darker, the major tint being chestnut-brown; the last whorl may even be purplish. Nuclear whorls about 2, small, well-rounded, smooth. Postnuclear whorls inflated, strongly rounded; the early ones marked by slender, well-elevated axial riblets, which are rather distantly spaced. These riblets evanesce, and on the last two turns they are indicated as mere lines of growth. Suture strongly constricted. Periphery well rounded. Base rather short, well rounded, moderately broadly openly umbilicated, with a rounded carina at the outer termination of the umbilical wall. Aperture circular; peristome decidedly thickened and reflected, produced on the middle of the columella wall, and much narrower and somewhat sinuous on the parietal wall, where it is adnate to the preceding turn. Operculum typically farcimenid.

We are recognizing two subspecies, which the following key will differentiate:

KEY TO SUBSPECIES OF FARCIMEN (FARCIMEN) SUPERBUM

Shell large, height about 30 mm	superbum
Shell smaller, height about 26 mm	itinerarium

FARCIMEN (FARCIMEN) SUPERBUM SUPERBUM, new subspecies

PLATE 7, FIGURES 28–30

This subspecies occurs on the mountains forming the rim of Los Acostas and Luis Lazo and extends from there eastward on the north side through Pan de Azúcar and Costanera del Abra to the Costanera de San Vicente. On the south side it extends through Isabel Maria to the Sierra del Infierno. This race differs from *F.* (*F.*) *superbum itinerarium* in being much larger with the whorls more inflated and more rounded.

The type, U.S.N.M. No. 535931, comes from the Sierra de los Acostas, Luis Lazo, Pinar del Río. It has 8 whorls and measures: Height, 32.5 mm.; greater diameter, 16.5 mm.

FARCIMEN (FARCIMEN) SUPERBUM ITINERARIUM, new subspecies

PLATE 7, FIGURES 10–12

This subspecies extends from the Potrerito at Luis Lazo, through the mogotes bordering the road from there to Sumidero, Cabezas and Isabel María, in Pinar del Río Province.

It is smaller than the typical race and is more inclined to have the last whorl purplish.

The type, U.S.N.M. No. 535932, comes from Potrerito. It has 7.1 whorls and measures: Height, 26.6 mm.; greater diameter, 14.1 mm.

FARCIMEN (FARCIMEN) HENDERSONI, new species

Shell of medium size, elongate-ovate, varying in color on the early whorls from flesh colored to pale chestnut-brown, while the later turns are always darker; they may be unicolor, but usually tend toward purplish plum colored. Nuclear whorls about 2, small, well rounded, smooth. Postnuclear whorls inflated, strongly rounded, marked in the one race by rather strong, retractively curved axial riblets; the other is almost without these. Suture quite strongly constricted. Periphery well rounded. Base only moderately produced, openly moderately umbilicated. Aperture circular; peristome very much thickened and reflected, marked by concentric lines of growth, produced on the columella and much narrower on the parietal wall than on the rest. Operculum typically farcimenid.

We are recognizing two subspecies, which the following key will help to distinguish:

KEY TO SUBSPECIES OF FARCIMEN (FARCIMEN) HENDERSONI

Axial riblets strong	catalinense
Axial riblets obsolete	hendersoni

FARCIMEN (FARCIMEN) HENDERSONI CATALINENSE, new subspecies

Plate 7, Figures 22–24

This race comes from La Catalina north of San Diego de los Baños. We also have it from La Cumbre and Hato Caimito west of Pan de Guajaibón, Pinar del Río Province. This is smaller than typical *F.* (*F.*) *hendersoni* and has very pronounced, distantly spaced, slender riblets, which are present even on the last turn.

The type, U.S.N.M. No. 535937, comes from Cayito de la Catalina. It has 5.5 whorls remaining and measures: Height, 22.3 mm.; greater diameter, 11.0 mm.

FARCIMEN (FARCIMEN) HENDERSONI HENDERSONI, new subspecies

Plate 7, Figures 13–15

This subspecies has a rather wide distribution, extending from Paso Real through Teneria de Guane, through La Murrallia eastward to Güira de Luis Lazo; Lagunillas; Mogote del Cerro de Cabras to Cayo San Felipe; Consolacion del Sur and Entronque Herradura, Pinar del Río Province. On the north side it extends through Mogote Pan de Azúcar, the valley east of Baños de San Vicente through La Mina and Bella Maria, Pinar del Río Province. This race is a little larger than *F.* (*F.*) *hendersoni catalinense* and has the whorls almost smooth, while *catalinense* has them strongly ribbed.

The type, U.S.N.M. No. 535936, comes from the Mogote del Cerro de Cabras. It has 7.1 whorls and measures: Height, 24.0 mm.; greater diameter, 12.3 mm.

FARCIMEN (FARCIMEN) ARANGOI, new species

Plate 7, Figures 16–18

Shell very small, ovate. Nuclear whorls decollated. Postnuclear whorls very strongly inflated, rounded, and marked by slender, retractively curved axial riblets, which grow irregular and less differentiated on the last turn. Suture strongly constricted. Base short, inflated, strongly rounded, and marked by an obsolete keel at the outer rim of the umbilicus. Aperture circular; peristome only moderately expanded, reflected, and slightly produced on the basal lip, a little wider on the columellar wall than on the rest, almost as wide on the parietal wall as on the outer lip. The operculum is not known.

The type, U.S.N.M. No. 535938, was collected by Arango at La Caja, Pinar del Río Province. It has 5.4 whorls remaining and measures: Height, 16.1 mm.; greater diameter, 8.3 mm.

FARCIMEN (FARCIMEN) GUANENSE, new species

Shell elongate-ovate. Nuclear whorls white, the rest pale orange, or the last whorl may even be partly or wholly brilliant orange or purplish. Nuclear whorls 1.5, small, well rounded, smooth. Postnuclear whorls well rounded, narrowly shouldered at the summit, the first three marked by slender, well-raised, rather closely spaced, and retractively slanting axial riblets, while on the remaining turns these become obsolete or are merely indicated near the summit. Suture well constricted. Periphery well rounded. Base protracted, openly umbilicated, marked by a rounded carina at the umbilical junction. Aperture circular; peristome rather broadly expanded and reflected, protracted on the columella, narrower on the parietal wall and marked by concentric lines of growth. Operculum typically farcimenid.

We are recognizing two subspecies, which the following key will help to differentiate:

KEY TO THE SUBSPECIES OF FARCIMEN (FARCIMEN) GUANENSE

Shell large, about 28 mm. high	guanense
Shell small, about 23 mm. high	lagunillense

FARCIMEN (FARCIMEN) GUANENSE GUANENSE, new subspecies

PLATE 7, FIGURES 1–3

This race comes from the region of Guane. We have it from the caves of the mogotes on the south side of the road opposite the Sierra de Guane; Los Portales; La Murrallia; and from the mogote at Punta de la Sierra, Pinar del Río Province. It is distinguished from *F.* (*F.*) *guanense lagunillense* by being much larger, more elongate and with a more protracted base.

The type, U.S.N.M. No. 535926, from Guane, has 7.6 whorls and measures: Height, 29.2 mm.; greater diameter, 13.4 mm.

FARCIMEN (FARCIMEN) GUANENSE LAGUNILLENSE, new subspecies

PLATE 7, FIGURES 19–21

This small race was collected by Wright at Lagunillas in the District of San Juan Martinez, Pinar del Río Province. It differs from the typical race in being much smaller, having the last whorl protracted, and having the basal two-thirds of the last whorl orange colored or darker.

The type, U.S.N.M. No. 535927, has 6.4 whorls remaining and measures: Height, 23.0 mm.; greater diameter, 12.1 mm.

FARCIMEN (FARCIMEN) PROCER (Poey)

PLATE 7, FIGURES 25–27

1852. *Cyclostoma tortum* var. POEY, Memorias sobre la historia natural de la Isla de Cuba, vol. 1, pl. 13, figs. 12–18.

1854. *Megalomastoma procer* POEY, *ibid.*, p. 404.

1856. *Megalomastoma complanatum* PFEIFFER, Proc. Zool. Soc. London, vol. 24, p. 36.

Shell rather large, pale chestnut-brown with an olivaceous flush; the early whorls lighter and the last one darkest. Peristome white; interior of the aperture reflecting the external coloration. Nuclear whorls almost 2, small, well rounded, smooth. The postnuclear whorls are well rounded and marked by slightly retractively curved, slender, hairlike axial riblets on the early turns, which grow less strong on the succeeding whorls and become obsolete on the last. Suture slightly constricted. Periphery well rounded. Base somewhat produced, with an obsolete shoulder at the outer margin of the moderately wide-open umbilicus. Aperture subcircular; peristome broadly expanded, widest on the inner lip, thick, reflected. The posterior portion of the expanded lip almost touches the preceding turn and largely hides the umbilicus when viewed squarely. The peristome on the parietal wall is exceedingly narrow. Operculum typically farcimenid.

This species comes from the Isle of Pines, where we collected it in large numbers on the Sierra de Casas, Sierra de Caballus, Sierra de Colombo, and the Morrillo del Diablo. In the latter place they appear to be a trifle smaller.

The specimen described and figured, U.S.N.M. No. 535939, was collected by Bartsch at the northwestern part of the Sierra de Casas. It has almost 7 whorls remaining and measures: Height, 32.7 mm.; greater diameter, 15.9 mm.

APEROSTOMINAE, new subfamily

Cyclophorid mollusks having a helicoid shell and an operculum bearing calcifications on its external surface.

Genus CROCIDOPOMA Shuttleworth

1857. *Crocidopoma* Shuttleworth, Journ. Conchyl., vol. 5, pp. 271–272.
1891. *Crocidopoma* Crosse, Journ. Conchyl., vol. 39, p. 160. (Type, *Crocidopoma floccosum* (Shuttleworth).)

This genus embraces small aperostomid mollusks whose whorls are marked by strong spiral cords and whose operculum bears a strongly elevated and outwardly reflected calcified lamella. The basal chondroid plate extends beyond the turns of the calcified lamella and breaks up on the outside into slender, thin, fluted, and striated fimbriations.

Type: *Cyclostoma* (*Cyclotus*) *floccosum* Shuttleworth=*Crocidopoma* (*Crocidopoma*) *floccosum* (Shuttleworth).

The genus appears to be confined to Cuba and Hispaniola. It breaks up into two subgenera, the typical one of which, *Crocidopoma*, is confined to Hispaniola, while *Cyclocubana* is restricted to Cuba.

KEY TO THE SUBGENERA OF CROCIDOPOMA

Fimbriations of chondroid plate extending above edge of calcareous lamella	Crocidopoma
Fimbriations of chondroid plate not extending above edge of calcareous lamella	Cyclocubana

Cyclocubana, new subgenus

In this subgenus the fimbriations of the outer edge of the chondroid basal plate extend but little if at all beyond the outer edge of the calcareous lamella.

Type: *Cyclotus perdistinctus* Gundlach=*Crocidopoma* (*Cyclocubana*) *perdistinctum* (Gundlach).

KEY TO THE SPECIES OF THE SUBGENUS CYCLOCUBANA

Shell planorboid	perdistinctum
Shell depressed-helicoid	gundlachi

CROCIDOPOMA (CYCLOCUBANA) PERDISTINCTUM (Gundlach)

Shell planorboid, horn colored. Nuclear whorls about 1.5. Postnuclear whorls very strongly rounded, circular in cross-section with strongly channeled suture, marked by well-raised spiral lirations varying in number in the different subspecies. The axial sculpture consists of incremental lines. The last whorl may or may not be solute. Operculum typical of that of the subgenus.

This species differs from *Crocidopoma* (*Cyclocubana*) *gundlachi* in having the spire very depressed; in the latter, it is depressed-helicoid. We are recognizing two subspecies:

KEY TO THE SUBSPECIES OF CROCIDOPOMA (CYCLOCUBANA) PERDISTINCTUM

Spiral cords at peristome 24	toroense
Spiral cords at peristome 31	perdistinctum

CROCIDOPOMA (CYCLOCUBANA) PERDISTINCTUM TOROENSE, new subspecies

Plate 8, Figures 10–12

Shell planorboid. Nuclear whorls 1.5, strongly rounded, smooth. Postnuclear whorls very much rounded, circular in cross section, marked by strongly elevated spiral cords, which are of almost equal strength and are separated by spaces about three times as wide as the cords. Of these cords 9 occur between the summit and the periphery and 15 upon the remainder of the shell. The axial sculpture consists of incremental lines and somewhat rough resting spaces. Suture very deeply openly channeled. The last whorl is solute for about one-twentieth of a turn. Base very broadly openly umbilicated. Operculum as described for the subgenus.

The type, U.S.N.M. No. 355777, was collected by Gundlach at Monte Toro, Guantanamo, Oriente Province. It has 4 whorls and measures: Height, 4.2 mm.; greater diameter, 10.2 mm.; lesser diameter, 6.9 mm.

The lesser number of spiral cords will differentiate this from typical *C.* (*C.*) *perdistinctum perdistinctum* (Gundlach).

CROCIDOPOMA (CYCLOCUBANA) PERDISTINCTUM PERDISTINCTUM (Gundlach)

Plate 8, Figures 13–15

1858. *Cyclotus perdistinctus* Gundlach, Malak. Blätter, vol. 5, pp. 192–193.

Shell small, planorboid, thin, wax colored, with a greenish tinge. Nuclear whorls 1.5, well rounded, smooth, the last half turn showing the merest beginning of the spiral sculpture of the succeeding turns, forming a very slightly elevated apex. Postnuclear whorls circular in cross section, marked by strongly elevated, slender spiral cords, which increase in number with the growth of the shell by intercalation. On the first postnuclear turn 4 of these cords are present on the spire; on the second, 7 between the summit and the periphery, while on the last turn 31 can be counted in the circle of the peristome of the aperture. These spiral cords vary in strength, depending upon whether they represent intercalated elements or the major cord. They are never so wide as the spaces that separate them and rarely wider than one-half of the spaces. In addition to the spiral sculpture the shell is marked by slender incremental lines, which render the free edge of the cord slightly roughened. The last twentieth of a turn is solute. The underside shows a broad open umbilicus more or less funnel shaped, which shows all the whorls within. The inside of the operculum is convex, slightly calcified, showing all the turns, and the outside shows 10 turns of an oblique, outward-turned, calcified lamella, which is marked by slender striations, the turns of the lamella overlapping each other somewhat like shingles on a roof, leaving, however, a narrow space between them.

The specimen described and figured, U.S.N.M. No. 535776, was collected at San Andrés, near Reuter, Oriente Province by Dr. Ramsden, who has furnished information showing that this falls well within Gundlach's concept of Jurisdicción, Cuba, his type locality. It has 4.1 turns and measures: Height, 4.4 mm; greater diameter, 11.0 mm; lesser diameter, 7.6 mm.

A translation of Gundlach's statement relative to the animal of this species follows: I am using here the generic name *Cyclotus* because I consider the species more nearly related to *Megalomastoma* than *Cyclostoma*. The animal is very similar to that of *Megalomastoma*, as well as its mode of life under decaying leaves in the dark forest at the sugar plantation Felicitas in the region of Enramada. The animal is bright rose-red, with the head a little darker within, the antennae are cinnabar red and the forehead crossed by wrinkles. In crawling the always very dirty shell is carried almost perpendicular.

CROCIDOPOMA (CYCLOCUBANA) GUNDLACHI, new species

Shell depressed-helicoid, horn colored. Nuclear whorls about 1.5, well rounded, smooth; postnuclear whorls strongly rounded, circular in cross section, with strongly channeled suture. The postnuclear whorls are marked by narrow, strongly elevated spiral cords, which vary in number in the different subspecies and which increase in number by intercalation as the shell increases in size. The spaces between the spiral cords are wider than the spiral cords and they, as well as the cords, are crossed by incremental lines. Periphery well rounded; base broadly, openly umbilicated, and marked like the spire; the same sculpture extends into the umbilical wall. The last portion of the last whorl may be adnate to the preceding turn or slightly solute. The operculum is typically that of the subgenus.

The species occupies the mountain area of Oriente Province. We are recognizing three subspecies:

KEY TO THE SUBSPECIES OF CROCIDOPOMA (CYCLOCUBANA) GUNDLACHI

Spiral cords less than 25 ---------- ignotum
Spiral cords more than 30.
  Greater diameter more than 10 mm ---------- gundlachi
  Greater diameter less than 9 mm ---------- wrighti

CROCIDOPOMA (CYCLOCUBANA) GUNDLACHI IGNOTUM, new subspecies

PLATE 8, FIGURES 7–9

In the Evezard collection of the National Museum there are two specimens of a subspecies for which we have no specific locality. They are distinguished from the rest of the material at hand and agree perfectly with each other. We are, therefore, reluctantly bestowing a subspecific name upon them.

The type, U.S.N.M. No. 535775, has 4.3 whorls and shows at the aperture 10 spiral cords between the summit and the suture, 7 on the base and 7 on the umbilical wall. This measures: Height, 4.8 mm; greater diameter, 9.0 mm; lesser diameter, 7.0 mm.

The other specimen, U.S.N.M. No. 316425, has 4.2 whorls and the same number of spiral cords as the type, and measures: Height, 7.4 mm.; greater diameter, 8.2 mm.; lesser diameter, 6.8 mm.

The extremely small number of spiral cords differentiates it from the other two races.

CROCIDOPOMA (CYCLOCUBANA) GUNDLACHI GUNDLACHI, new subspecies

PLATE 8, FIGURES 1–3

This subspecies was collected by Gundlach at Monte Toro.

The type, U.S.N.M. No. 535773, has 4 whorls and at the aperture shows the following number of cords: Between the summit and the periphery 10, on the base 10, on the umbilicus 16. It yields the following measurements: Height, 6.3 mm.; greater diameter, 10.9 mm.; lesser diameter, 8.4 mm.

CROCIDOPOMA (CYCLOCUBANA) GUNDLACHI WRIGHTI, new subspecies

PLATE 8, FIGURES 4–6

In the National Museum we have four specimens collected by Charles Wright at Potosi, Oriente Province. Potosi, while not on recent maps, from information at hand we know is situated somewhere north of Monte Libano and Felicidad. These specimens are differentiated from the other two members by being a little more closely coiled.

The type, U.S.N.M. No. 535774, has 4.1 whorls and measures: Height, 5.1 mm.; greater diameter, 8.9 mm.; lesser diameter, 6.9 mm. It has 12 spiral cords between the summit and the suture, 11 on the base, and 8 on the umbilical wall, a total of 31 when viewed at the aperture.

The other two specimens are complete and yield, respectively, the following information: Number of whorls, 4.1 and 3.7; number of spiral cords between the summit and suture, 12 and 12; spiral cords on base, 10 and 8; spiral cords on the umbilical wall, 10 and 10. They measure respectively: Height, 5.3 and 5.0 mm.; greater diameter, 8.3 and 8.2 mm.; lesser diameter, 6.5 and 6.2 mm.

PART 2.—THE CYCLOPHORID MOLLUSKS OF THE WEST INDIES, EXCLUSIVE OF CUBA

By PAUL BARTSCH

Family CYCLOPHORIDAE Gray

For a definition of the family, see p. 3.

KEY TO THE ANTILLEAN SUBFAMILIES OF THE FAMILY CYCLOPHORIDAE

Shell elongate-turrited	Megalomastominae
Shell not elongate-turrited.	
Shell pupoid	Diplommatininae
Shell not pupoid, but planorboid or helicoid.	
Operculum chondroid	Amphicyclotinae
Operculum calcified	Aperostominae

Subfamily MEGALOMASTOMINAE Torre and Bartsch

Cyclophorid mollusks having an elongate-conic or elongate-turrited shell. Operculum corneous.

For complete diagnosis, see p. 3.

KEY TO THE WEST INDIAN GENERA OF MEGALOMASTOMINAE

Shell large and robust.	
Whorls of operculum fused	Farcimen
Whorls of operculum distinct	Farcimoides
Shell not large and robust, but small and thin	Megalomastoma

Genus FARCIMEN Troschel

For diagnosis of the genus, see p. 4.

The subgenus *Farcimen* is restricted to the island of Cuba and is therefore not considered in this part of our paper.

Subgenus NEOPUPINA Kobelt

1854. *Megaloma* WOODWARD, A manual of the Mollusca, p. 177 (not *Megaloma* Hall, 1852).
1856. *Lomastoma* WOODWARD, *ibid.*, p. xviii (not Rafinesque, 1819).
1902. *Neopupina* KOBELT, Das Tierreich, Cyclophoridae, p. 262.

This subgenus differs from the Cuban *Farcimen* in having a more cylindric shell and in having the peristome sharp, i. e., not broadly thickened and reflected. Operculum a thin chondroid multispiral plate.

Type: *Megalomastoma flavula* Swainson = *Helix crocea* Gmelin = *Farcimen* (*Neopupina*) *croceum* (Gmelin).

The anatomy of *Farcimen* (*N.*) *croceum* (Gmelin) and *F.* (*N.*) *curtum* (Dall and Simpson) yields the radula formula 3:3:3:3. The jaw is provided with a median projection, and the verge is attached to the side of the neck, gradually tapering without a terminal appendage. It is traversed by a seminal groove.

KEY TO THE SPECIES OF SUBGENUS NEOPUPINA

Axial ribs strong .... curtum
Axial ribs not strong.
  Shell large, height more than 30 mm .... croceum
  Shell small, height less than 20 mm .... hjalmersoni

FARCIMEN (NEOPUPINA) CURTUM (Dall and Simpson)

PLATE 9, FIGURES 32–34 (type); FIGURES 35–37

1901. *Megalomastoma croceum curtum* DALL and SIMPSON, Bull. U. S. Fish Comm. for 1900, vol. 1, p. 434, pl. 53, fig. 2.

Shell small, varying from elongate-ovate to cylindroconic in outline, varying in color from wax yellow to pale brown. Nuclear whorls decollated in all our specimens. Postnuclear whorls moderately well rounded, marked by rather strong, closely approximated axial riblets. Suture well impressed. Periphery well rounded. Base moderately produced, very narrowly umbilicated, with a strong carina marking the outer edge of the umbilicus. Aperture subcircular; peristome not in one plane, but somewhat sinuous, simple. Operculum typically farcimenid.

The type, U.S.N.M. No. 159678, comes from Hucares, east Puerto Rico. It has 5.5 whorls remaining and measures: Height, 21.0 mm.; greater diameter, 9.5 mm.

This small species differs from the other two from Puerto Rico in having the riblets much more strongly developed.

Additional specimens come from various stations on the eastern slope of Puerto Rico, and since the type is a worn specimen, I am also figuring a more perfect one, which has almost 7 whorls and measures: Height, 23.0 mm.; greater diameter, 9.1 mm.

The animals of specimens collected by me about the roots of banana trees at Mamey in the foothills of the Sierra Luquilla, June 23, 1929, had the entire dorsal part of the body flesh colored with a grayish suffusion and a pinkish flush; the sole of the foot was also flesh colored, while the tentacles were pale orange with a grayish tinge. There was a reddish spot present under the tentacles.

FARCIMEN (NEOPUPINA) CROCEUM (Gmelin)

Plate 9, Figures 23–25

1786. *Helix cylindracea glabra* Chemnitz, Neues systematisches Conchylien-Cabinet, vol. 9, p. 166, pl. 35, fig. 1233 (nonbinomial).
1791. *Helix crocea* Gmelin, Systema naturae, vol. 6, p. 3655.
1798. *Cerion truncatum* Bolten, Museum Boltenianum, p. 90.
1822. *Cyclostoma flavula* Lamarck, Histoire naturelle des animaux sans vertèbres, vol. 6, p. 146.
1828. *Turbo flavidus* (*Cyclostoma flavidum*) Wood, Index testaceologicus, ed. 2, Suppl., pp. 19, 36, pl. 6, fig. 31.
1838. *Cyvlostoma crocea* Deshayes, in Lamarck's Histoire naturelle des animaux sans vertèbres, ed. 2, vol. 8, p. 357.
1840. *Megalomastoma flavula* Swainson, A treatise on malacology, p. 336.
1847. *Farcimen flavulum* Troschel, Zool. Malak., vol. 4, p. 44.
1847. *Megalomastoma cylindraceum* Pfeiffer, Zool. Malak., vol. 4, p. 109.

Shell large, cylindroconic, varying in color from soiled wax colored to bright rose colored. The nucleus is small, consisting of 2 whorls, which are well rounded and smooth. The postnuclear whorls are flattened, somewhat constricted a little below the suture, and marked by closely approximated, low, rounded axial riblets, which become less conspicuous as the whorls increase. Suture only slightly constricted. Periphery well rounded. Base slightly protracted, narrowly umbilicated, and marked by an obsolete fold at the outer edge of the umbilicus. Aperture subcircular; peristome not in one plane, but somewhat sinuous, simple, not thickened as in typical *Farcimen*. Operculum typically farcimenid.

The specimen figured, U.S.N.M. No. 535945, has 6.5 whorls remaining and measures: Height, 39.1 mm.; greater diameter, 14.7 mm.

This is the common large race distributed all over the north coast of the Island of Puerto Rico.

I found the adult animal of this to have the forehead, sides, and back brown with an olivaceous tinge, the foot flesh colored, with a bluish tinge, tentacles tipped with orange.

The young were flesh colored, with a red spot under the tentacles.

FARCIMEN (NEOPUPINA) HJALMERSONI (Pfeiffer)

Plate 9, Figures 26–28

1875. *Megalomastoma hjalmersoni* Pfeiffer, Malak. Blätter, vol. 22, p. 119.

Shell small, elongate-ovate, varying in color from pale wax yellow to chestnut-brown on the last turn. Nuclear whorls 2, well rounded, smooth. The early postnuclear whorls are strongly rounded; the rest with a constriction below the summit and marked by closely spaced, slender, retractively slanting axial riblets, which become obsolete on the last whorl. Suture slightly constricted. Periphery well rounded. Base moderately protracted, narrowly umbilicated, the umbilicus marked by a strong carina at its outer edge. Aperture subcircular; peristome somewhat sinuous, not in one plane, simple. Operculum typically farcimenid.

The specimen described and figured is one of a series, U.S.N.M. No. 535692, collected by me at Lares, Puerto Rico. It has 7.1 whorls and measures: Height, 19.7 mm.; greater diameter, 8.9 mm.

This species resembles the large *F.* (*N.*) *croceum* (Gmelin) in the constriction below the summit and also in the character of the ribbing, which is much finer than that of the other small species, *F.* (*N.*) *curtum* (Dall and Simpson), from eastern Puerto Rico.

We also have it from a number of additional stations in the west-central portion of the Island of Puerto Rico.

FARCIMOIDES, new genus

Shells resembling those of the Cuban genus *Farcimen* in general outline and thickened peristome, but with a spiral cord marking the outer limit of the umbilicus. Operculum not simple but with the many layers composing it distinct, not fused as in *Farcimen*.

Type: *Cyclostoma orbignyi* Pfeiffer=*Farcimoides orbignyi* (Pfeiffer).

KEY TO THE HISPANIOLAN SPECIES OF FARCIMOIDES

Shell small, height less than 20 mm ---------- sallei
Shell not small, height more than 25 mm.
    Shell stout ---------- domingoense
    Shell not stout ---------- orbignyi

FARCIMOIDES SALLEI, new species

PLATE 9, FIGURES 29–31

1851. *Cyclostoma orbignyi* va. γ PFEIFFER, Proc. Zool. Soc. London, vol. 19, p. 149.
1853. *Cyclostoma orbignyi* variety 2 PFEIFFER, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 272, pl. 37, figs. 5, 6.

Shell small, very elongate-ovate, covered with a wax-colored periostracum. When denuded the shell may be unicolor or milk white, or the last whorl may be darker, even purplish plum colored. Nuclear whorls small, well rounded, smooth. The early postnuclear whorls inflated, strongly rounded, the last one almost flattened; the early ones marked by slender, almost hairlike axial riblets which gradually increase in strength until they become conspicuous, retractively curved, elevated ribs, which are about as wide as or wider than the spaces that separate them. Suture strongly constricted. Periphery well rounded. Base rather long, openly umbilicated with a strong cordlike carina marking the outer limit of the umbilicus. This has a strong constriction anteriorly and posteriorly. The axial riblets extend feebly over the umbilical wall. Aperture circular, slightly irregular as far as its external plane is concerned; peristome thickened and marked by concentric lamellae of about the same expansion all around. Operculum typically farcimoid.

The type, U.S.N.M. No. 535941, was collected by Dr. Abbott at El Rio, which is between Constancia and Jarabacoa, Dominican Republic, at an elevation of 4,000 feet. It has 7.5 whorls and measures: Height, 19.0 mm.; greater diameter, 7.7 mm.

This I consider to be the small form described by Pfeiffer as *Cyclostoma orbignyi* var. γ. It differs markedly from the other two known Haitian species by its much smaller size, much more inflated whorls, and much heavier ribbing.

FARCIMOIDES DOMINGOENSE, new species

Plate 9, Figures 1–3

Shell cylindroconic, stout, varying from wax color to pale brown on the last turn. Nuclear whorls? The early postnuclear whorls gain rapidly in size and are fairly well rounded; the later ones are decidedly flattened. They are all narrowly shouldered at the summit and marked by slender, sigmoid, retractively curved axial riblets, which are about as wide as the spaces that separate them on the early turns and wider on the last. These riblets render the summit of the turns slightly crenulated. Suture well constricted. Periphery well rounded. Base moderately protracted, openly umbilicated, and marked with a strong cord at the outer junction of the umbilicus, which is deeply constricted at its umbilical edge and less so dorsally. Aperture subcircular in a wavy plane; peristome thick, a little narrower on the parietal wall than on the rest. Operculum typically farcimoid.

The type, U.S.N.M. No. 535940, was collected by Parker in the Dominican Republic. It has 6.4 whorls remaining and measures: Height, 28.8 mm.; greater diameter, 12.0 mm.

Two other lots before us are also without specific locality data. All these are readily distinguished from *F. orbignyi* (Pfeiffer) by their much more cylindric form and much stouter outline.

FARCIMOIDES ORBIGNYI (Pfeiffer)

Plate 9, Figures 4–6

1851. *Cyclostoma orbignyi* Pfeiffer, Proc. Soc. London, vol. 19, p. 149.
1852. *Cyclostoma orbignyi* Pfeiffer, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 272, pl. 37, figs. 3, 4.

Shell almost cylindroconic, varying in color from unicolor to wax yellow, with the last whorl with a reddish orange band, which is separated from the summit and base by a paler area. Peristome white. Nuclear whorls 2, small, well rounded, smooth. The first 2 postnuclear whorls rather strongly inflated, the rest gradually less inflated and finally flattened. The postnuclear whorls are marked by closely spaced, decidedly retractively curved, slender axial riblets, which are about as wide as the spaces that separate them. Suture rendered conspicuous by the feeble shoulder of the whorls. Periphery well rounded. Base decidedly protracted, openly umbilicated, marked by a somewhat obsolete cord at the outer limit of the umbilicus. The umbilical wall marked by the continuation of the axial riblets. Aperture subcircular; peristome thickened and reflected, narrower on the columellar wall than on the rest. Operculum typically farcimoid.

The specimen figured is one of a large series, U.S.N.M. No. 151351, from the Sallé collection, probably a topotype. It has 8.4 whorls and measures: Height, 28.2 mm.; greater diameter, 11.5 mm. The locality mentioned is Haiti, the designation for all Hispaniola in the early days. We know Sallé collected only in the Santo Dominican region, so the species must be referred to the Dominican Republic.

All our other lots are equally deficient in specific locality data.

Genus MEGALOMASTOMA (Guilding) Swainson

1840. *Megalomastoma* (Guilding) SWAINSON, A treatise on malacology, pp. 186, 336, figs. 97 g, h, i.

Shell small, cylindroconic, covered with a persistent periostracum. Nuclear whorls smooth, the succeeding turns marked with strongly elevated, retractively curved axial riblets. Base with a strong spiral keel at the outer limit of the broad open umbilicus. Aperture subcircular; peristome double, with a rather deep, somewhat lunate excision on the parietal wall. Operculum a simple, thin, multispiral, chondroid plate.

Type: *Megalomastoma brunnea* (Guilding) Swainson=*Megalomastoma* (*Megalomastoma*) *brunneum* (Guilding) Swainson.

This genus ranges from St. Thomas through St. John to Tortola.

The radula of *Megalomastoma* (*Megalomastoma*) *petiti* has the formula 3 : 3 : 3 : 3. The jaw has a median projection, and the verge is attached to the side of the neck, gradually tapering without a terminal appendage. It is traversed by a seminal groove.

KEY TO THE SUBGENERA OF MEGALOMASTOMA

Last whorl axially ribbed	Megalomastoma
Last whorl axially tuberculated	Megalomastomoides

Subgenus MEGALOMASTOMA (Guilding) Swainson

Megalomastomas having the surface with axial ribs only, and with the peristome excised on the parietal wall.

Type: *Megalomastoma brunnae* (Guilding) Swainson=*Megalomastoma* (*Megalomastoma*) *brunneum* (Guilding) Swainson.

KEY TO THE SPECIES OF SUBGENUS MEGALOMASTOMA

Shell elongate-conic.	
Axial ribs of early whorls closely spaced	antillarum
Axial ribs of early whorls not closely spaced	brunneum
Shell elongate-ovate	petiti

MEGALOMASTOMA (MEGALOMASTOMA) ANTILLARUM (Sowerby)

Plate 9, Figures 10–12, 21

1843. *Cyclostoma antillarum* Sowerby, Thesaurus conchyliorum, vol. 1, p. 150, pl. 28, fig. 180.

Shell small, elongate-conic, chestnut-brown with the peristome white. The nucleus consists of a single smooth turn. The early postnuclear whorls are inflated and strongly rounded; the later ones a little less so, marked by moderately elevated, slender, sublamellar, retractively slanting axial ribs, which are very regular on the first two turns and rather closely spaced; on the later turns they are much more distantly spaced and there is a tendency for finer threads to appear in the broad interspaces. Suture strongly constricted. Periphery well rounded. Base protracted, openly umbilicated, and marked by a moderately strong, broad, rounded cord at the outer limit of the umbilicus, which is crossed by the axial ribs. Aperture subcircular; peristome not on a flat plane, but sinuous, moderately thickened and reflected, and moderately excised on the parietal wall. Operculum typically megalomastomid.

The specimen described and figured is one of a lot, U.S.N.M. No. 393653. It was collected by me on Mount Sage, Tortola, British West Indies. It has 7.5 whorls and measures: Height, 13.6 mm.; greater diameter, 5.1 mm.

This species recalls closely *M.* (*M.*) *brunneum* (Guilding) Swainson, from which it can be distinguished readily by its smaller size and more closely spaced axial ribs on the early turns. The umbilical cord is also less pronounced.

MEGALOMASTOMA (MEGALOMASTOMA) BRUNNEUM (Guilding) Swainson

Plate 9, Figures 7–9, 22

1840. *Megalomastoma brunnea* (Guilding MS.) Swainson, A treatise on malacology, pp. 186, 336, fig. 97, *g*, *h*, *i*.

Shell elongate-conic, chestnut-brown, with the peristome white. Nuclear whorls 1.2, well rounded, smooth. The early postnuclear whorls inflated; the later ones less so and the last one flattened, marked by very decidedly retractively curved, slender, sublamellar axial ribs, which are rather distantly spaced on all the whorls. On the later turns axial hairlines are also apparent in the intercostal spaces. These are irregularly distributed and of irregular numbers. Suture very strongly constricted. Periphery low, well rounded. Base decidedly produced, flatly umbilicated with a decidely elevated keel at the outer limit of the umbilicus, which is rendered crenulated by the axial riblets that extend also over the umbilical wall. Aperture subcircular; peristome sinuous, that is not in a flat plane, moderately thickened and moderately excised on the parietal wall. Operculum typically megalomastomid.

The specimen described and figured, U.S.N.M. No. 535943, comes from St. Thomas. It has 8.2 whorls and measures: Height, 15.4 mm.; greater diameter, 6.2 mm.

There are 17 additional lots of this species, all from St. Thomas, in the collection of the United States National Museum.

This species is nearest related to *M.* (*M.*) *antillarum* (Sowerby), from which its more elongate form, more distantly spaced ribs, and more pronounced umbilical keel will readily differentiate it.

MEGALOMASTOMA (MEGALOMASTOMA) PETITI, new species

Plate 9, Figures 16–18, 20

Shell elongate-ovate, sooty chestnut-brown; peristome white. Nuclear whorls 1.3, well rounded, smooth. The early postnuclear whorls somewhat inflated, strongly rounded, the last one slightly flattened and marked by slender sublamellar, rather distantly spaced axial riblets, which are rather irregularly distributed. Suture well constricted. Periphery well rounded. Base rather produced, flatly umbilicated, with a moderately strong cord at the outer limit of the umbilicus. Aperture circular; peristome almost flat, moderately thickened, slightly reflected and moderately excised on the parietal wall. Operculum typically megalomastomid.

This species comes from the Island of St. John. The type, U.S.N.M. No. 535942, was collected by me on Bordeaux Hill, Hurricane Harbor, St. John. It has 7 whorls and measures: Height, 12.3 mm.; greater diameter, 5.4 mm.

The United States National Museum contains six additional lots, all from St. John.

This species is easily distinguished from the other Megalomastomas by its shorter and much stouter shape.

MEGALOMASTOMOIDES, new subgenus

Shell resembling *Megalomastoma* in size, shape, and periostracal covering but differing from it in having the peristome not excised on the parietal wall and in having the early postnuclear sculpture as in typical *Megalomastoma*, while that of the later turns has the axial ribs broken up into elongated, somewhat lunate tubercles, which gives to the surface of these whorls a rasplike appearance. Operculum a simple, thin, multispiral chondroid plate.

Type: *Cyclostoma* (*Megalomastoma*) *verruculosum* Shuttleworth= *Megalomastoma* (*Megalomastomoides*) *verruculosum* (Shuttleworth).

Distribution: Puerto Rico.

MEGALOMASTOMA (MEGALOMASTOMOIDES) VERRUCULOSUM (Shuttleworth)

Plate 9, Figures 13–15, 19

1854. *Cyclostoma* (*Megalomastoma*) *verruculosum* Shuttleworth, Berner Mitth., p. 90.

1864. *Megalomastoma verruculosum* Sowerby, Thesaurus conchyliorum, vol. 3, pl. 263, fig. 15.

Shell small, elongate-conic. Nuclear whorls decollated in all our specimens. Postnuclear whorls well rounded, the early ones marked by slender, retractively curved axial riblets, which are about as wide as the spaces that separate them. On the last three turns these riblets break up into segments and give to the surface a rasplike appearance. Suture strongly constricted. Periphery well rounded. Base produced, openly flatly umbilicated, and marked by a strong spiral cord at the outer limit of the umbilicus, which is crossed by the axial riblets, which extend over the umbilical wall. Aperture circular, not in a single plane, but sinuous; peristome thickened and somewhat reflected, of equal width all around, not incised on the parietal wall. Operculum multispiral, corneous, with central nucleus.

We have this species from Puerto Rico without specific locality.

The specimen described and figured, U.S.N.M. No. 535944, has 7 whorls remaining and measures: Height, 15.1 mm.; greater diameter, 5.7 mm.

This shell is small like typical *Megalomastoma* but differs from it markedly by the sculpture and the absence of excision on the parietal wall.

Subfamily DIPLOMMATININAE Kobelt

This subfamily is defined in the key on p. 43.

Genus ADELOPOMA Doering

For definition of the genus, see p. 148.

ADELOPOMA OCCIDENTALE (Guppy)

PLATE 40, FIGURE 6

1872. *Diplommatina huttoni occidentalis* GUPPY, Proc. Assoc. Trinidad, vol. 2, p. 24.
1884. *Diplommatina occidentale* GODWIN-AUSTEN, Land and Freshwater Mollusca of India, vol. 1, pl. 45, fig. 8.
1886. *Diplommatina occidentalis* GODWIN-AUSTEN, ibid., p. 173.
1893. *Diplomatina huttoni occidentale* GUPPY, Journ. Conch., vol. 7, p. 226.
1898. *Palaina* (*Cylindropalaina*) *occidentalis* KOBELT and MÖLLENDORFF, Nachrbl. deutschen malak. Ges., vol. 30, p. 133.
1902. *Adelopoma occidentale* KOBELT, Das Tierreich, vol. 16, p. 480.

Shell minute, sinistral, thin, translucent, alabaster white, except the nuclear turns, which are buff. Nuclear whorls 1.5, inflated, strongly rounded, smooth. Post nuclear whorls inflated, strongly rounded, marked by slender, lamellose, scalariform, decidedly protractively slanting axial ribs, of which 27 occur on the first and second and 33 on the last whorl. The spaces separating the axial ribs are four or five times as wide as the ribs, and are covered by exceedingly fine, microscopic spiral striations. Suture very strongly constricted. Base inflated, very strongly rounded, with a narrow umbilical chink, marked by the continuation of the axial ribs. Aperture irregularly obliquely oval; peristome double, the inner exserted; the outer narrowly expanded. Operculum typically adelopomid.

The specimen figured is one of nine, U.S.N.M. No. 203654, received from Bland and comes from Trinidad. It has 6 whorls and measures: Height, 2.3 mm.; diameter, 1.2 mm.

U.S.N.M. No. 98734 contains six specimens from the same source, while U.S.N.M. No. 516033 contains seven specimens received from Dr. George Clapp.

This species differs from *A. costaricense* in being a little stouter and having more axial ribs, which also are of uniform expansion from the summit to the periphery.

Subfamily AMPHICYCLOTINAE Kobelt and Möllendorff

Cyclophorids of helicoid outline with chondroid operculum.

KEY TO THE WEST INDIAN GENERA OF THE SUBFAMILY AMPHICYCLOTINAE

Operculum with fimbriations	**Cyclohaitia**
Operculum without fimbriations	**Amphicyclotulus**

CYCLOHAITIA, new genus

Small amphicyclotine shells with strong spiral cords on spire and base. Operculum multispiral, chondroid, with the outer edge of the last whorl expanded into fimbriations. In shape and sculpture the shells of this genus resemble *Crocidopoma*, but they lack the subsutural keel and the lirations within the umbilicus; they also resemble it in the fimbriations of the operculum, but here we have no calcareous lamella. The verge likewise is of amphicyclotine pattern in its attenuation.

Type: *Cyclohaitia haitia*, new species.

The anatomy of *Cyclohaitia* shows the radula formula to be 3:3:3:3, and of the jaw is lacking the median points. The verge is on the back of the neck behind the tentacles and traversed by a vas deferens. The terminal appendage is long and threadlike, almost as long as the basal portion.

CYCLOHAITIA HAITIA, new species

Plate 10, Figures 12–14

Shell small, helicoid, openly moderately umbilicated, covered with an olivaceous, wax-colored periostracum. Nuclear whorls 1.5, small, well rounded, smooth, forming a moderately elevated apex. Postnuclear whorls strongly rounded, circular in cross-section, marked by incremental lines and rather strong spiral cords, of which 5 are present on the first, 7 on the second, and 9 on the last turn between summit and periphery in the type. These cords vary somewhat in strength and spacing. The whorls at the summit slope decidedly toward the suture and render this very conspicuous. Periphery strongly rounded. Base strongly rounded, marked by 9 spiral cords equaling those of the spire, and the continuations of the incremental lines. The umbilical wall does not have spiral cords, only the continuation of the lines of growth. Aperture slightly oblique, circular; peristome simple. Operculum chondroid, multispiral, with the outer edge of the later whorls much produced to form a more or less fimbriated, up-turned extension.

The type, U.S.N.M. No. 535855, was collected north of Tiburon, Haiti, along the road leading to Carcasse, south of the first village, by C. R. Orcutt. It has 4.4 whorls and measures: Height, 5.2 mm.; greater diameter, 9.0 mm.; lesser diameter, 6.7 mm. Charles R. Orcutt also collected 10 additional lots ranging from the type locality eastward along the south coast of Haiti to the Baie des Flamands.

Some of the dead specimens are much larger than the type. For example U.S.N.M. No. 403722, from Damassin River has 4.6 whorls and measures: Height, 8.7 mm.; greater diameter, 12.0 mm.; lesser diameter, 9.0 mm., but all intermediate sizes are present in lots from the same locality.

Genus AMPHICYCLOTULUS Kobelt

1912. *Amphicyclotulus* Kobelt, Martini-Chemnitz, Conchylien Cabinet, vol. 1, sect. 19, pt. 3, p. 913.

Small cyclophorids with chondroid multispiral operculum, the outer edge of which is *not* expanded into fimbriations. The spire is marked by incremental lines and in the typical subgenus bears raised spiral cords, at least on the early whorls. In this they may also be present on the base. (In the subgenus *Cycloblandia* the spiral cords are absent.) The base is broadly openly umbilicated. The peristome is not thickened or reflected.

Type: *Amphicyclotulus rufescens* (Sowerby).

The genus is Antillean.

The anatomy of *A.* (*A.*) *acutiliratus* (Drouet) and *A.* (*A.*) *mineri* shows the radula to have the formula 3:3:3:3, and the jaw without median projection. The verge is on the back of the neck behind the tentacles and is traversed by a vas deferens. The terminal appendage is long and threadlike, almost as long as the basal portion.

KEY TO THE SUBGENERA OF AMPHICYCLOTULUS

Shell with spiral lamellae---------------------------------- **Amphicyclotulus**
Shell without spiral lamellae------------------------------------ **Cycloblandia**

Subgenus AMPHICYCLOTULUS Kobelt

Amphicyclotulus in which all or at least the early postnuclear whorls are marked by raised spiral cords, which may or may not be present on the base.

Type: *Amphicylotulus rufescens* (Sowerby).

This subgenus is known from Puerto Rico, Guadeloupe, Dominica, and Martinique.

KEY TO THE SPECIES OF SUBGENUS AMPHICYCLOTULUS[1]

Spiral sculpture confined to early postnuclear whorls.
  Shell orange-yellow-- **mineri**
  Shell wax yellow------------------------------------- **guadeloupensis**
Spiral sculpture not confined to early postnuclear whorls.
  Spiral sculpture consisting of strongly raised cords.
    Spiral cords on spire strongly crenulated------------------- **rufescens**
    Spiral cords on spire not strongly crenulated.
      Spiral cord bounding umbilicus stronger than the rest- **acultiliratus**
      Spiral cord bounding umbilicus not stronger than the rest.
        Spiral cords of base distantly spaced-------------- **schrammi**
        Spiral cords of base not distantly spaced---------- **dominicensis**
  Spiral sculpture not consisting of strongly raised cords.
    Spiral sculpture consisting of strongly raised threads.
      Spiral threads numerous------------------------------------ **liratus**
      Spiral threads few--------------------------------------- **perplexus**

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[1] *A.* (*A.*) *portoricensis* (Boettger) is not included in this key, as I have not seen specimens of it.

AMPHICYCLOTULUS (AMPHICYCLOTULUS) MINERI, new species

Plate 10, Figures 15–17

Shell rather large, helicoid, moderately broadly openly umbilicated, covered by an orange-yellow periostracum. Nuclear whorls 1.6, well rounded, smooth, forming a depressed apex. Postnuclear whorls inflated, strongly rounded, marked by incremental lines and slender spiral threads, which cover the anterior two-thirds of the turns, the posterior third being without them. Of these threads 7 are present on the second and 11 on the third whorl. On the last half of the last turn the spiral threads are quite obsolete. Suture well impressed. Periphery inflated, strongly rounded. Base moderately rounded with the umbilicus occupying about one-fourth of the diameter of the shell. The base is marked by incremental lines only. Aperture subcircular, being protracted to form an acute point at the posterior angle of the aperture; peristome simple. Operculum typically amphicyclotulid.

The type, U.S.N.M. No. 535856, and a host of specimens come from Laudat, Dominica. The type has 5.5 whorls and measures: Height, 13.3 mm.; greater diameter, 16.6 mm.; lesser diameter, 13.6 mm.

This species resembles most closely *A.* (*A.*) *guadeloupensis*, from which its orange coloration and more elevated form readily distinguish it.

AMPHICYCLOTULUS (AMPHICYCLOTULUS) GUADELOUPENSIS, new species

Plate 10, Figures 18–20

Shell depressed-helicoid, moderately broadly openly umbilicated, wax yellow. Nuclear whorls 1.5, well rounded, smooth. The postnuclear whorls are well rounded, the first smooth, the rest marked by weak spiral threads which cover the posterior four-fifths of the turn, being absent near the summit. They again become obsolete on the last half turn. In addition to the spiral threads the whorls are marked by fine incremental lines. Suture moderately well impressed. Periphery inflated, well rounded. Base short, well rounded, marked only by the incremental lines. In cross section the last whorl is inclined toward being oval. Aperture oblique, subcircular, slightly angulated at the posterior angle; peristome simple. Operculum typically amphicyclotulid.

The type, U.S.N.M. No. 116462, comes from Guadeloupe. It has 5.1 whorls and measures: Height, 12.8 mm.; greater diameter, 17.6 mm.; lesser diameter, 14.0 mm.

Additional specimens in the collection of the National Museum are also labeled merely "Guadeloupe," without specific locality.

This species resembles most closely *A.* (*A.*) *mineri* from Dominica. It is distinguished from this by its flatter form and paler coloration.

AMPHICYCLOTULUS (AMPHICYCLOTULUS) RUFESCENS (Sowerby)

Plate 10, Figures 4, 5

1843. *Cyclostoma rufescens* Sowerby, Thesaurus conchyliorum, vol. 1, p. 94, pl. 24, figs. 36, 37.

1843. *Cyclostoma rufescens* Sowerby, Proc. Zool. Soc. London, vol. 11, p. 60.

"Shell nearly orbicular, generally of a reddish colour, with a short spire consisting of 4 rounded, spirally ridged and striated volutions; the ridges crenulated; suture deep; aperture circular, with a thin sharp peritreme; umbilicus large. From Martinique, communicated by L. T. Powis, Esq."

I have not seen specimens that satisfy Sowerby's description and figures which I have copied.

Specimens of *A.* (*A.*) *acutiliratus* (Drouet) vary considerably in tuberculation of their spiral keels, and it is quite possible that Sowerby's species represents merely an exaggerated form of Drouet's *A.* (*A.*) *acutiliratus.*

AMPHICYCLOTULUS (AMPHICYCLOTULUS) ACUTILIRATUS (Drouet)

Plate 10, Figures 1–3

1859. *Cyclophorus acutiliratus* Drouet, Essai sur les mollusques terrestres et fluviatiles de la Guyane française, p. 89, pl. 3, figs. 42–44.

Shell moderately large, openly umbilicated, varying in color from pale yellow to bright red. Nuclear whorls 2.5, well rounded, smooth. Postnuclear whorls strongly rounded, marked by exceedingly fine, closely spaced, incremental lines, which give the surface a silky appearance, and strong sublamellar keels, of which 5 are present between the summit and the suture on the next to the last whorl, and 10 on the last turn. These keels are not quite regular in strength and distribution. They average from one-half to one-fourth the width of the spaces that separate them. Suture channeled. Periphery rounded. Base with the umbilicus about one-fourth the greater diameter. Base well rounded, marked by 8 spiral cords. The umbilicus is bounded by a strong lamella and on the umbilical wall, within the umbilicus, 6 additional spiral lamellae are present. Aperture oblique, circular; peristome simple, rendered somewhat fluted by the spiral sculpture. Operculum typically amphicyclotulid.

The specimen described and figured, U.S.N.M. No. 535859, a female, is one of five specimens collected by me at Colson, 14 to 15 km. north of Fort de France, Martinique. This has 5.4 whorls and measures: Height, 11.1 mm.; greater diameter, 15.3 mm.; lesser diameter, 12.0 mm.

U.S.N.M. No. 393879 contains seven specimens from the same locality.

U.S.N.M. No. 151358 contains a series of specimens collected by Sallé on Martinique. These show considerable variation. In some the spiral cords show slight nodulation, which suggests a trend toward *A.* (*A.*) *rufescens* (Sowerby); in fact, there is a possibility that this may be an extreme variation of that species. The spiral keels on the umbilicus will easily distinguish it from all other known *Amphicyclotulus.*

AMPHICYCLOTULUS (AMPHICYCLOTULUS) SCHRAMMI (Shuttleworth)

PLATE 10, FIGURES 6–8

1857. *Cyclostoma* (*Cyclophorus*) *schrammi* SHUTTLEWORTH, Journ. Conchyl., vol. 5, p. 269.

Shell small, depressed-helicoid. Periostracum wax colored. Nuclear whorls almost 2, well rounded, smooth. Postnuclear whorls well rounded, marked by slightly keeled spiral cords, of which 5 are present on the second, while on the third 2 additional cords appear between the first near the summit and the suture. At the aperture 10 spiral cords are apparent. In addition to these spiral cords the shell is marked by fine incremental lines. Suture moderately constricted. Periphery well rounded. Base openly umbilicated, the umbilicus forming about one-fourth of the greater diameter of the shell. The base is sculptured like the spire, bearing 5 cords, while 3 additional ones are present on the outer portion of the umbilical wall, the inner part being free of spiral sculpture. Aperture oblique, almost circular, slightly angulated at the posterior angle; peristome simple. Operculum typically amphicyclotulid.

U.S.N.M. No. 491754 contains two specimens from Guadeloupe, one of which we have figured. This has 4.4 whorls and measures: Height, 5.5 mm.; greater diameter, 9.3 mm.; lesser diameter, 7.6 mm.

U.S.N.M. No. 331792 contains two more specimens received from Petit.

This species is most nearly related to *A.* (*A.*) *dominicensis*, from which it is easily distinguished by its much more distantly spaced spiral cords on the base.

AMPHICYCLOTULUS (AMPHICYCLOTULUS) DOMINICENSIS, new species

PLATE 10, FIGURES 9–11

Shell small, helicoid, openly umbilicated. The nuclear and early postnuclear turns red, the rest covered by a yellowish periostracum. Nuclear whorls 2, well rounded, smooth. Postnuclear whorls somewhat inflated, strongly rounded, marked by strongly raised, almost keellike spiral threads, of which 9 are present between the summit and the suture on the next to the last whorl and 9 between the summit and the periphery on the last whorl. The spaces that separate these cords.

which are quite regular, are a little more than twice as wide. Periphery rendered almost angulated by a spiral cord. In addition to the spiral cords the whorls are marked by slender incremental lines. Suture well impressed. Base rather short, well rounded, marked by the continuation of the incremental lines and 9 spiral cords, which equal those on the spire in strength, but weaken toward the aperture. The umbilical wall also shows traces of spiral cords. The umbilicus is about one-fifth the greater diameter of the last whorl. Aperture oblique; peristome simple. Operculum typically amphicyclotulid.

The type, U.S.N.M. No. 535857, comes from Long Dilton, Dominica. It has 4.5 whorls and measures: Height, 5.5 mm.; greater diameter, 8.0 mm.; lesser diameter, 7.2 mm. A paratype is in the American Museum of Natural History.

This species is nearest related to *A.* (*A.*) *schrammi* (Shuttleworth), from which it can be distinguished readily by its color and the greater number of spiral cords.

AMPHICYCLOTULUS (AMPHICYCLOTULUS) LIRATUS (Drouet)

PLATE 11, FIGURES 4–6

1859. *Cyclophorus liratus* DROUET, Essai sur les mollusques terrestres et fluviatiles de la Guyane française, p. 88, pl. 3, figs. 30–32.

Shell decidedly depressed-helicoid, openly umbilicated, covered by a wax-colored periostracum. Nuclear whorls 1.3, well rounded. Postnuclear whorls strongly rounded, marked by rather strong, regular and regularly spaced spiral cords, of which 14 are present between the summit and the suture on the last turn. In addition to the spiral sculpture, the whorls are marked by closely spaced incremental threads. Suture well impressed. Periphery well rounded. Base moderately inflated, well rounded, marked by 18 spiral threads, which equal those on the spire in strength, and by the continuation of the incremental lines. The umbilicus is about one-fourth the width of the greater diameter of the shell, and the umbilical wall bears a few indications of spiral threads. A cross section of the last whorl would appear broadly oval. Aperture slightly oblique, circular, with scarcely any angling at the posterior angle of the aperture; peristome simple. Operculum typically amphicyclotulid.

The specimen described and figured, U.S.N.M. No. 474037, comes from Martinique. It has 4.4 whorls and measures: Height, 7.3 mm.; greater diameter, 14.2 mm.; lesser diameter, 10.3 mm.

This species suggests both *A.* (*A.*) *mineri* and *A.* (*A.*) *guadeloupensis* but differs from them in having the spiral sculpture extend to the peristome and in being much more depressed.

AMPHICYCLOTULUS (AMPHICYCLOTULUS) PERPLEXUS, new species

Plate 11, Figures 7–9

Shell small, depressed-helicoid, covered by a wax-yellow periostracum, which assumes a rosy tinge toward the apex. Nuclear whorls almost 2, well rounded, smooth. Postnuclear whorls inflated, strongly rounded, marked by slender incremental lines and on the next to the last turn by six low, rounded spiral threads, of which the one at the summit is weaker than the rest. On the last whorl these threads become obsolete and almost vanish before reaching the peristome. Suture moderately impressed. Periphery well rounded. Base well rounded, openly umbilicated, the umbilicus being about one-third the width of the greater diameter. The base is marked by incremental lines only. Aperture slightly oblique, circular, with a slight angle at the posterior angle; peristome simple. Operculum typically amphicyclotulid.

The type, U.S.N.M. No. 535858, comes from Guadeloupe. It has 4.9 whorls and measures: Height, 7.0 mm.; greater diameter, 11.5 mm.; lesser diameter, 8.0 mm.

U.S.N.M No. 43485 contains another specimen from the same locality.

U.S.N.M. No. 151348a contains two additional specimens collected by Sallé on Guadeloupe.

The weak sculpture of this species will differentiate it from the rest of the species.

AMPHICYCLOTULUS (AMPHICYCLOTULUS) PORTORICENSIS (Boettger)

Plate 11, Figures 19–21

1887. *Cyclotus portoricensis* Boettger, Jahrb. deutschen malak. Ges., vol. 14, pp. 101–102, pl. 4, fig. 7.

Shell broadly openly umbilicated, umbilicus equaling a fifth part of the width of the base, depressed-turbinate, solid, olivaceous, a little lighter on the base, shining, spire little expanded, convex; apex quite small, somewhat obtuse, after decortication, red. Whorls, 5–5.5, increasing regularly in size, with impressed disjunct suture, convex, minutely rugulose striate and everywhere densely spirally lirate, lirae 13–15 in the penultimate whorl, last whorl terete, base more convex, a little expanded at the aperture or slightly descending. Aperture moderately large, oblique; peristome continuous, straight, acute, white, with the margin somewhat thickened all around; columella a little retracted and reflected. Operculum immersed, corneous with 11 turns, its nucleus concave.

Height, 13–13.5 mm.; diameter, 19.5–20.5 mm.; height of aperture, 9.5–10.5 mm.; diameter, 8.5–9.5 mm. Habitat, Rio Blanco, in the Sierra de Caduros, Puerto Rico.

Boettger says he had before him seven specimens sent to him by Otto Goldfuss.

I have not seen this species and have freely translated Dr. Boettger's description and copied his figures.

It is related to *A.* (*A.*) *guadeloupensis*, *A.* (*A.*) *mineri*, and *A.* (*A.*) *liratus* (Drouet). The strong lirations of the base will distinguish it from the first two; it is easily differentiated from the last by its much larger size.

CYCLOBLANDIA, new subgenus

Amphicyclotulus in which the whorls, even the early postnuclear turns, are without raised spiral cords or threads.

Type: *Cyclostoma beauiana* Petit=*Amphicyclotulus* (*Cycloblandia*) *beauianus* (Petit).

We know this subgenus from Guadeloupe, Grande Terre, Dominica, and Martinique.

The anatomy of *A.* (*Cycloblandia*) *amethystinus* (Guppy) shows the radula to have the formula 3:3:3:3, and the jaw without median projection. The verge is on the back of the neck behind the tentacles, and traversed by a vas deferens. The terminal appendage is long and threadlike, almost as long as the basal portion.

KEY TO THE SPECIES OF SUBGENUS CYCLOBLANDIA

Shell large, greater diameter more than 15 mm	amethystinus
Shell small, greater diameter less than 12 mm	beauianus

AMPHICYCLOTULUS (CYCLOBLANDIA) AMETHYSTINUS (Guppy)

PLATE 11, FIGURES 1–3

1868. *Cyclotus amethystinus* GUPPY, Ann. Mag. Nat. Hist., ser. 4, vol. 1, p. 433.

Shell large, depressed-helicoid, covered by a pale olive periostracum. Nuclear whorls 1.8, well rounded, smooth. Postnuclear whorls inflated, strongly rounded, marked by fine incremental lines, which vary somewhat in strength and by inconspicuous hair lines a little darker than the general coloration of the shell. In cross section the whorls are rather inclined to oval than circular. Suture well impressed, particularly so on the early turns. Periphery strongly rounded. Base not inflated, well rounded, marked by incremental lines equaling those on the spire, which on the last portion of the last whorl become intensified. Aperture oblique, almost circular; peristome simple. Operculum with about 8 whorls, thin, horny, with the outer edge of the turns slightly upturned and the exposed portion retractively striate.

The specimen described and figured, U.S.N.M. No. 473947, is one of several hundred which I collected at Danes on the east side of the watershed east of Portsmouth, Dominica, August 4, 1928. It has 5.0 whorls and measures: Height, 9.3 mm.; greater diameter, 15.2 mm.; lesser diameter, 12.0 mm. The larger series is registered as U.S.N.M. No. 473946.

My notes say of the animal: "Entire surface flesh-colored with a roseate flush, a pale rose-colored space runs across the snout in front of the tentacles, which are bright orange. The sole of the foot of the same coloration as the dorsal part. Found on the ground under decaying rubbish."

AMPHICYCLOTULUS (CYCLOBLANDIA) BEAUIANUS (Petit)

Plate 11, Figures 10–12

1853. *Cyclostoma beauiana* Petit, Journ. Conchyl., vol. 4, p. 363, pl. 11, figs. 11, 12.
1854. *Cyclostoma inornata* Redfield, Ann. Lyc. Nat. Hist. New York, vol. 6, p. 13, pl. 1, fig. 7.

Shell small, depressed-helicoid, openly umbilicated, olivaceous horn colored. Nuclear whorls 1.6, well rounded, smooth. Postnuclear whorls strongly rounded, marked by fine incremental lines only. The summit of the whorls is slightly flattened near the suture, which renders this fairly conspicuous. Periphery well rounded. Base inflated, strongly rounded, marked like the spire. Aperture oblique, almost circular, slightly angulated at the posterior angle; peristome simple. Interior of the aperture reddish orange within, paling toward the edge. Operculum thin, horny, multispiral.

The specimen described and figured, U.S.N.M. No. 535844, is one of five collected by me at Traicou Chet, Crois Rivier, Guadeloupe, July 31, 1928. It has 4.4 whorls and measures: Height, 7.7 mm.; greater diameter, 11.0 mm.; lesser diameter, 8.2 mm.

I collected two additional specimens, U.S.N.M. No. 390055, at Habitation La Tapick, Guadeloupe. Two specimens, U.S.N.M. No. 151348, were collected by Sallé with the locality Guadeloupe. A dead specimen, U.S.N.M. No. 390085, was obtained at Lepes, Grande Terre, July 30, 1928; and six more, U.S.N.M. No. 393113, were collected at Grande Ravine, Grande Terre.

These latter specimens are not distinguishable from those taken on Guadeloupe. Petit's species was described from Grande Terre and Redfield's from Guadeloupe.

Subfamily APEROSTOMINAE Torre and Bartsch

This subfamily is defined on p. 38.

KEY TO THE GENERA OF WEST INDIAN APEROSTOMINAE

Basal chondroid plate produced into fimbriations.
  Spire with spiral keels or cords ---------------------------- Crocidopoma
  Spire without spiral keels or cords.
    Peristome with a breathing notch --------------------- Cyclojamaicia
    Peristome without a breathing notch --------------- Cyclovendreysia
Basal chondroid plate not produced into fimbriations.
  Operculum with a strongly elevated calcareous lamella.
    Lamella incurved throughout ------------------------- Cyclopilsbrya
    Lamella not incurved throughout.
      Lamella expanded at free edge ------------------- Ptychocochlis
      Lamella not expanded at free edge -------------------- Poteria
  Operculum without a strongly elevated calcareous lamella ---- Aperostoma

Genus CROCIDOPOMA Shuttleworth

For definition of *Crocidopoma* see p. 39.

Our knowledge of the anatomy of *Crocidopoma* (*Crocidopoma*) *vortex elevatum* is based upon a very poorly preserved specimen of the animal of this species. It shows a radula having the formula 3: 3: 3: 2. The male reproductive system resembles that of *Amphicyclotulus*.

A key to the subgenera of *Crocidopoma* will be found on p. 39.

Subgenus CROCIDOPOMA Shuttleworth

1857. *Crocidopoma* SHUTTLEWORTH, Journ. Conchyl., vol. 5, pp. 271–272.
1891. *Crocidopoma* CROSSE, Journ. Conchyl., vol. 39, p. 160.

In this subgenus the flocculations of the operculum extend very greatly beyond the edge of the calcareous lamella.

Type: *Cyclostoma* (*Cyclotus*) *floccosum* Shuttleworth = *Crocidopoma* (*Crocidopoma*) *floccosum* (Shuttleworth).

This subgenus is confined to Hispaniola.

KEY TO THE SPECIES OF THE SUBGENUS CROCIDOPOMA[2]

Subsutural spiral keel very strong ---------------------------------- vortex
Subsutural spiral keel not very strong.
  Suture very broadly channeled.
    Shell planorboid -- casuelense
    Shell depressed-helicoid ---------------------------------- milleri
  Suture not very broadly channeled.
    Shell helicoid -- orcutti
    Shell depressed-helicoid ---------------------------------- abbotti

---

[2] *C.* (*C.*) *floccosum* (Shuttleworth) is not included in this key for lack of material for differential comparison with material at hand, none of our specimens satisfying the description thereof.

CROCIDOPOMA (CROCIDOPOMA) VORTEX (Weinland)

Shell small, almost lenticular with a thin yellowish-brown periostracum, which is usually worn on the keels, exposing them as white lines. The denuded shell is white. Nuclear whorls 1.5, strongly rounded, smooth. The postnuclear whorls are well rounded and marked by elevated spiral keels, of which 6 are present between the summit and the suture on the first turn and 7 on the remaining whorls. On the last half of the last turn there are usually intercalated threads. Periphery well rounded. Base well rounded and marked by 5 strong keels between the periphery and the edge of the umbilicus, 5 more being present on the umbilical wall. The umbilicus is open and the whorls can be seen within. Aperture very slightly oblique, circular; peristome rendered sinuous by the spiral cords. Operculum typically crocidopomid.

The species is restricted to the southwestern peninsula.

We are recognizing two subspecies, which the following key will help to differentiate:

KEY TO THE SUBSPECIES OF CROCIDOPOMA VORTEX

Shell lenticular ---------- vortex
Shell depressed-helicoid ---------- elevatum

CROCIDOPOMA (CROCIDOPOMA) VORTEX VORTEX (Weinland)

Plate 11, Figures 13–15

1862. *Cyclostoma vortex* Weinland, Malak. Blätter, vol. 9, p. 90.
1869. *Cyclotus vortex* Pfeiffer, Nov. Conch., vol. 3, p. 445, pl. 98, figs. 17–20.

Shell small, almost lenticular, with a pale yellowish-brown periostracum, which when worn from the strong spiral keels leaves the white shell below exposed. Nuclear whorls 1.5, strongly rounded, smooth. Postnuclear whorls well rounded, marked by decidedly elevated spiral keels, of which 6 are present between summit and suture on the first turn, and 7 on the remaining turns. On the last half of the last turn intercalated finer threads appear between the heavy keels. In addition to the spiral keels the shell is marked by rather strong incremental lines. The space between the very strongly elevated keel near the summit and the summit of the whorl makes the suture a deeply impressed channel. Periphery well rounded. Base well rounded, marked like the spire, 5 strong keels being present between the periphery and the edge of the umbilicus and 5 more on the umbilical wall. The umbilicus is broad and extends to the very first whorl. The last turn is solute for about one-twentieth of a turn. Aperture very slightly oblique, circular; peristome rendered slightly sinuous by the spiral cords and somewhat notched by the first spiral cord below the suture, which undoubtedly when closed by the operculum leaves a breathing space. Operculum typically crocidopomid.

This subspecies has a rather wide range along the coast of the southern peninsula. We have many specimens, from many stations, ranging from Port-au-Prince around the end of the island, down the south coast to near Aquin, to some of the outlying small islands of the region. Throughout this range the shells are fairly constant, differing, however, materially in size in the individual colonies and also in the amount of solution with the last turn. In an exceedingly large old individual this may extend over considerably more space than in those not quite so big. Specimens collected by Henderson and Simpson at La Ferrier, Haiti, U.S.N.M. Nos. 162982 and 490072, and by W. L. Abbott at Sosúa, Dominican Republic, U.S.N.M. Nos. 336766 and 336788, both near the north coast of Hispaniola, are indistinguishable from those of the south peninsula.

The specimen that has served for my description and figure, U.S.N.M. No. 403073, comes from the type locality, a little west of Jérémie. It has 4.1 whorls and measures: Height, 6.7 mm.; greater diameter, 11.8 mm.; lesser diameter, 9.0 mm.

A very large specimen from Anse du Clerc, Dept. du Sud, U.S.N.M. No. 401741, has 4.6 whorls and measures: Height, 9.9 mm.; greater diameter, 14.2 mm.; lesser diameter, 9.8 mm.

CROCIDOPOMA (CROCIDOPOMA) VORTEX ELEVATUM, new subspecies

Plate 11, Figures 16–18

This subspecies agrees completely in its sculpture with the typical form. It differs materially from it, however, in being much more elevated and in having the keel at the summit much more closely approximated to the preceding turn, thus making the channeled suture much narrower. The specimens were collected on top of Mount Rochelois.

The type, U.S.N.M. No. 535846, was collected by W. J. Eyerdam and measures: Height, 8.9 mm.; greater diameter, 12.4 mm.; lesser diameter, 9.9 mm.

CROCIDOPOMA (CROCIDOPOMA) FLOCCOSUM (Shuttleworth)

Plate 12, Figure 16

1857. *Cyclostoma* (*Cyclotus*) *floccosum* Shuttleworth, Journ Conchyl., vol. 5, pp. 268, 272.

1863. *Cyclotus floccosus* Reeve, Conchologia iconica, vol. 14, sp. 48.

Shell broadly umbilicated, depressed, thin, with incremental hair lines and closely spaced, slightly nodulose, spiral keels, which alternate in strength, whitish with a thin soiled-yellow periostracum. The apex does not project materially and is rather obtuse. Suture deeply channeled. Whorls 4.5, convex, the last descending, keeled above and solute. Aperture scarcely oblique, circular; peristome simple and acute. Operculum typical. Height, 7.0 mm.; greater diameter, 12.0 mm.; lesser diameter, 9.0 mm. Aperture, 4 mm. broad and wide.

The above is a translation of Shuttleworth's description to which he adds, "Habitat, Haïti Sallé."

I have mapped Sallé's travels in the island of Hispaniola. They did not extend into the range of what I am here calling *C.* (*C.*) *vortex* (Weinland), which occupies the western portion of the south peninsula, and which has been at times confused with the present species. *C.* (*C.*) *floccosum* (Shuttleworth) is from Santo Domingo. The United States National Museum collection contains other species from Santo Domingo, but it does not have representatives of *C.* (*C.*) *floccosum.* For that reason I am copying Reeve's figure.

CROCIDOPOMA (CROCIDOPOMA) CASUELENSE Crosse

Plate 41, Figures 7–9

1891. *Crocidopoma casuelense* Crosse, Journ. Conchyl., vol. 39, p. 161.
1902. *Crocidopoma casuelense* Kobelt, Das Tierreich, Cyclophoridae, pp. 259–260, fig. 54.

Shell planorbid, covered with a thin yellow periostracum (nuclear whorls decollated). The postnuclear whorls are strongly rounded and marked by strong spiral keels, of which 7 are present on the first remaining turn between the summit and the periphery, and 12 on the same space on the last turn. The first keel at the suture is only a trifle heavier than the remaining ones. The spaces between these keels are broader than the keels. The axial sculpture consists of fine hair lines, and the last whorl is solute for about one-tenth of a turn. Suture very deeply impressed. Periphery well rounded. Base very broadly openly umbilicated and marked by 6 spiral keels equaling in strength those on the spire. There are 7 additional spiral keels of equal strength and spacing on the umbilical wall. On the base and umbilical wall the keels are narrower than the spaces that separate them. Aperture subcircular; peristome slightly reflected, thin. Operculum typically crocidopomid.

The specimen described and figured, U.S.N.M. No. 331865, is one of the Redfield collection collected by Cuming. It has 3 postnuclear whorls remaining and measures: Height, 5.2 mm.; greater diameter, 10.5 mm.; lesser diameter, 7.7 mm. I have been unable to locate the exact position of Casuela in Hispaniola.

CROCIDOPOMA (CROCIDOPOMA) MILLERI, new species

Plate 12, Figures 1–3

Shell helicoid, covered with a pale brown periostracum, or at least one would be led to believe so by the fragments clinging to the specimen at hand. Nuclear whorls about 1.6, well rounded, smooth. Postnuclear whorls inflated, very strongly rounded, marked by rather slender, rather broad, spiral cords, of which 11 are present on the last two turns between summit and suture. These are separated by spaces only a little wider than the cords. The one at the summit is broader than the rest and the space between the summit and this is deeply inbent to form a wide channel at the suture. Periphery strongly rounded. Base inflated, strongly rounded, marked by 10 spiral cords which equal those of the spire in strength and spacing. Umbilicus moderately broad, the umbilical wall of the last whorl bears 6 spiral cords. Aperture circular; peristome rendered slightly sinuous by the spiral cords, slightly notched at the heavy cord near the summit. Operculum?

The type, U.S.N.M. No. 389796, has 3.7 whorls remaining and measures: Height, 7.0 mm.; greater diameter, 9.9 mm.; lesser diameter, 7.4 mm. It was collected by Gerrit S. Miller on the slope of Loma de Cielo, Bohoruco Mountains, at an altitude of 3,000 feet, Polo, Barahona District, Dominican Republic.

CROCIDOPOMA (CROCIDOPOMA) ORCUTTI, new species

Plate 12, Figures 36–38

Shell large for the genus, depressed-helicoid, covered by a pale yellowish periostracum. Nuclear whorls 1.5, well rounded, smooth. Postnuclear whorls inflated, strongly rounded, marked by moderately elevated spiral cords, of which 8 are present on the first, 10 on the second, and 16 on the last part of the last turn between summit and periphery. These cords increase in number by intercalation and therefore vary considerably in strength. The first one near the summit, however, is always stronger than the rest. In addition to this the shell is marked by rather strong incremental lines, which are more or less hairlike and give to the spiral cords an almost granular aspect. Suture profoundly narrowly channeled. Periphery well rounded. Base strongly rounded, moderately broadly umbilicated, marked by 9 spiral cords between which finer threads are present at the termination of the last whorl. The umbilical wall bears 6 spiral cords with an intercalated one between the outer heavy keels. Last whorl solute for about one-twentieth of a turn. Aperture slightly oblique, almost circular, with a slight notch formed by the subsutural keel; peristome smooth. Operculum typically crocidopomid.

This species was collected by Charles R. Orcutt on Gimbi Mountain in the southwestern part of the southern peninsula of Haiti.

The type, U.S.N.M. No. 535847, has 4.5 whorls and measures: Height, 11 mm.; greater diameter, 14 mm.; lesser diameter, 10.8 mm.

CROCIDOPOMA (CROCIDOPOMA) ABBOTTI, new species

Plate 12, Figures 13–15

Shell almost lenticular, white (it has lost its periostracum). Nuclear whorls? Postnuclear whorls strongly rounded, marked by slender, well elevated, spiral keels, of which 6 are present between summit and suture on the first, 8 on the second, and 9 on the last whorl. These keels are only about one-fourth as wide as the spaces that separate them. The first one near the summit is much stronger and broader than the rest and is notched at the peristome to furnish a breathing space. Suture narrowly and profoundly channeled. Periphery well rounded. Base strongly rounded, marked by 6 slender spiral keels. The umbilicus is very broad and profound. The wall on the last whorl bears 5 spiral keels. The last whorl is solute for about one-thirtieth of a turn. Aperture circular, very slightly oblique; peristome simple, except that it is rendered wavy by the spiral cords. Operculum?

The type, U.S.N.M. No. 356197, a broken specimen, has lost the nuclear whorls and part of the last turn. The 2.3 whorls remaining measure: Height, 6.3 mm.; greater diameter, 10.5 mm.; lesser diameter, 7.4 mm. This was collected by Dr. Abbott at "Cave, Savanna, 1 hour west of Maniel Viejo, Bohoruco Mts.," southwest Dominican Republic; altitude, 2,510 feet.

A young specimen, U.S.N.M. No. 389873, was collected by Gerrit S. Miller at Polo, District Barahona, Bohoruco Mountains, altitude 2,000 feet, Dominican Republic.

While I dislike to base a species on an imperfect specimen, for the sake of completeness I am here doing so.

CYCLOJAMAICIA, new genus

Medium-sized aperostomids of almost lenticular form, with deeply channeled suture and a decided narrow notch in the peristome at the posterior angle of the aperture, which leaves on the preceding parts of the whorls at this part of the shell a rough raised cord. Operculum with a multispiral, strongly elevated, obliquely outward curved calcareous lamella between the turns of which project thin scalelike fimbriations, the outer extension of the basal chondroid elements; on the inner turns these are worn off to the length of the calcerous lamella, while on the outer margin in perfect specimens they project to fully triple the width of the calcareous lamella as partly overlapping, obliquely placed shingles. These fimbriations therefore are not merely a cutting up of the expanded basal chondroid plate, but they represent in a measure a decidedly folded and cut feature. These fimbriations on the outer whorl are also somewhat fluted. They are as thin as tissue paper and unless very carefully handled might easily be destroyed.

Type: *Cyclostoma suturale* Sowerby=*Cyclojamaicia suturalis* (Sowerby).

The genus is confined to Jamaica.

The radulae of *Cyclojamaicia bondi* (Vanatta) and *C. suturalis* (Sowerby) show the formula 3:3:3:3. The jaw of *C. bondi* is without median projection. The verge of both is situated on the back of the neck behind the tentacles and is swollen basally. It is traversed by a seminal groove only. The terminal appendage is very short and appears almost chitinized and is shaped like a single turn of the tip of a wood screw.

KEY TO THE SPECIES OF GENUS CYCLOJAMAICIA

Sutural channel wide	bondi
Sutural channel narrow	suturalis

CYCLOJAMAICIA BONDI (Vanatta)

PLATE 12, FIGURES 7–9

1936. *Poteria* (*Crocidopoma*) *bondi* VANATTA, Nautilus, vol. 49, pp. 98–99.

Shell lenticular, very broadly umbilicated, covered with a brownish wax-colored periostracum. Nuclear whorls about 1. Postnuclear whorls strongly rounded, the first without a keel at the summit, the rest with the strongly rounded keel at some distance from the preceding turn, which leaves a broadly channeled suture between that and the keel. The postnuclear whorls are marked by very closely spaced, hairlike, sublamellar axial riblets. In crossing the keel at the summit these become decidedly backward bent. Periphery well rounded. Base well rounded, marked like the spire. Aperture circular with a notch at the posterior keel as in *Cyclojamaicia suturalis* (Sowerby). Operculum as described in the generic diagnosis.

The specimen figured is one of a series, U.S.N.M. No. 399392, collected by Charles R. Orcutt at Retreat, 1 mile west of Great House, St. Ann Parish, Jamaica. It has 4.2 whorls and measures: Height, 6.1 mm.; greater diameter, 13.0 mm.; lesser diameter, 9.5 mm.

We have 22 lots of this species in the collection of the U. S. National Museum, which range from Stewart Town in a curve east to Moneague in St. Ann Parish.

CYCLOJAMAICIA SUTURALIS (Sowerby)

Plate 12, Figures 10–12

1843. *Cyclostoma suturale* Sowerby, Proc. Zool. Soc. London, vol. 11, p. 29.
1843. *Cyclostoma suturale* G. B. Sowerby, Thesaurus Conchyliorum, vol. 1, p. 91, pl. 23, figs. 1–2.

Shell lenticular, very widely umbilicated, covered with an olivaceous, wax-colored periostracum. Nuclear whorls about 1, well rounded, smooth. Postnuclear whorls strongly rounded, the first one with a normal suture, the rest with a decidedly elevated keel, separated from the preceding turn by a very deeply channeled suture. The keel in fact is a backward reflection of succeeding stages of the edge of the peristome, near the posterior angle of the aperture, where there exists a sinus, which forms a notch in the peristome, which serves as a breathing pore when the operculum closes the aperture. The postnuclear whorls are marked by very closely spaced, hairlike, sublamellar axial riblets. These in crossing the keel at the summit become decidedly backward bent. Periphery well rounded. Base well rounded, marked like the spire. Aperture circular, excepting the sinus at the posterior angle referred to above. Peristome simple. Operculum as described in the generic diagnosis.

The specimen described and figured, U.S.N.M. No. 535685, is one of four collected by Dr. H. Burrington Baker at his station J22, that is, the hill north of Rotten Gut, Manchester Parish, Jamaica. It has 4.5 whorls and measures: Height, 7.0 mm.; greater diameter, 14.4 mm.; lesser diameter, 10.6 mm.

We have 23 additional lots of this species, all of which come from the edge of the Cockpit country, from the northeastern part of St. Elizabeth to the northwestern part of Manchester Parish and the extreme southern part of Trelawny Parish. All this material comes from within a radius of 6 miles.

This species is easily distinguished from *Cyclojamaicia bondi* (Vanatta) by its much narrower channeled suture between the summit and the keel. Furthermore, the keel at the summit in *suturalis* is acute, while in *C. bondi* it is rounded.

Sowerby, in describing this species, said that G. C. Bainbridge, of Liverpool, had received a few specimens many years ago from the woods of Demerara. This is undoubtedly a mistake, for nothing like it has ever been reported from the mainland.

CYCLOVENDREYSIA, new genus

Small, planorboid, widely umbilicated aperostomids, the whorls of which are circular in cross section, the sculpture consisting of incremental threads only. Operculum with a multispiral calcareous lamella, which is outward reflected to touch the succeeding turn at the outer edge, leaving a tear-drop-shaped space separating them basally. This lamella bears strong oblique threads. The dorsal chondroid plate is projected and upward turned at the outer edge of the last whorl to the height of the calcareous lamella or slightly above it. The upturned edge is slightly fimbriated.

Type: *Cyclostoma dubiosum* C. B. Adams=*Cyclovendreysia dubiosa* (C. B. Adams).

We have been unable so far to find a male of this species. The radula has the formula 3:3:3:3, and the jaw lacks distinct median projections.

CYCLOVENDREYSIA DUBIOSA (C. B. Adams)

PLATE 12, FIGURES 4–6

1851. *Cyclostoma dubiosum* C. B. ADAMS, Ann. Lyc. Nat. Hist. New York, vol. 5, p. 81.

Shell lenticular, very widely openly umbilicated, covered with a brownish wax-colored periostracum. There is one nuclear turn, which is rounded and smooth. Postnuclear whorls inflated, strongly rounded, separated by a profoundly impressed suture and marked by slender, almost vertical, closely placed, hairlike axial riblets, which are a little more distantly spaced on the first turn than on the remaining turns. Periphery strongly rounded. Base very broadly openly umbilicated, well rounded, marked like the spire, which is also the sculpture of the umbilical wall. In cross section the whorls are circular. Aperture slightly oblique, circular; peristome simple. Operculum described in our generic diagnosis.

The specimen figured, U.S.N.M. No. 356120, is one of several collected by John B. Henderson at Ipswich, St. Elizabeth Parish, Jamaica. It has 4.5 whorls and measures: Height, 6.5 mm.; greater diameter, 14.5 mm.; lesser diameter, 11.0 mm.

The United States National Museum contains 22 lots, and in addition to this I have seen two lots from the C. B. Adams collection and four from the Academy of Natural Sciences of Philadelphia.

The material before me enables me to say that the species ranges from the northwestern corner of St. Elizabeth Parish northward to Montego Bay, St. James Parish, through Trelawny to Browns Town, St. Ann Parish. Throughout this range it shows no differentiation into races.

While the shell in general form resembles *Cyclojamaicia suturalis* (Sowerby) and *C. bondi* (Vanatta), its entirely different operculum and absence of sutural keel remove it at once from that complex.

CYCLOPILSBRYA, new genus

Medium-sized aperostomine mollusks having a strongly elevated spiral lamella on the outside of the whorls of the operculum, which is concavely curved on the inside.

Type: *Cyclostoma jugosum* C. B. Adams=*Cyclopilsbrya* (*Cyclopilsbrya*) *jugosa* (C. B. Adams).

The anatomy of *C.* (*C.*) *caribaea* (Clench and Aguayo) shows the radula formula 3:3:3:3.

The genus presents two primary modifications, which may be defined as subgenera, as follows.

KEY TO THE SUBGENERA OF GENUS CYCLOPILSBRYA

- Lamella curving uniformly inward to a sharp edge------------- Cyclopilsbrya
- Lamella not curving uniformly inward to a sharp edge, but with a broadly expanded fold, which extends from the outside of the free edge outward and downward almost to meet the next turn--- Cyclocaymania

CYCLOPILSBRYA, new subgenus

In this subgenus the strongly raised spiral lamella is curved inward and its free outer margin is sharp.

Type: *Cyclostoma jugosum* C. B. Adams=*Cyclopilsbrya* (*Cyclopilsbrya*) *jugosa* (C. B. Adams).

This subgenus is confined to western Jamaica, where it ranges through the parishes of Hanover, St. James, Westmoreland, and St. Elizabeth.

KEY TO THE SPECIES OF SUBGENUS CYCLOPILSBRYA[3]

- Umbilical keel well developed.
  - Wrinkled sculpture of base strong.
    - Shell large, greater diameter more than 20 mm---- westmorelandensis
    - Shell small, greater diameter less than 15 mm------------ hendersoni
  - Wrinkled sculpture of base feeble.
    - Pits outside of umbilical keel profound--------------- glenburniensis
    - Pits outside of umbilical keel not profound--------------- rupisfontis
- Umbilical keel obsolete.
  - Umbilicus very broad.
    - Retractively slanting axial ribs of base very regular----------- striosa
    - Retractively slanting axial ribs of base very irregular--------- jugosa
  - Umbilicus not very broad.
    - Shell large, greater diameter more than 24 mm--------------- caribaea
    - Shell small, greater diameter less than 18 mm.
      - Sculpture coarsely wrinkled---------------------------- rufilabris
      - Sculpture not coarsely wrinkled------------------------ asperula

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[3] I have not seen *C.* (*C.*) *beswicki* (Chitty) and therefore have not included it in this key.

CYCLOPILSBRYA (CYCLOPILSBRYA) WESTMORELANDENSIS (Chitty)

PLATE 12, FIGURES 30–32

1857. *Cyclotus westmorelandensis* CHITTY, Proc. Zool. Soc. London, vol. 25, p. 156.

1898. *Neocyclotus* (*Plectocyclotus*) *westmorelandensis* KOBELT and MÖLLENDORFF, Nachrbl. deutschen malak. Ges., vol. 29, p. 139, reprint.

1912. *Neocyclotus* (*Plectocyclotus*) *varians thielei* KOBELT, Martini-Chemnitz Conchylien Cabinet, vol. 1, sec. 19, pt. 3, p. 944, pl. 141, figs. 10–12.

Shell large, helicoid, the early whorls red, the last one pale brown with the appressed summit almost white. The nucleus consists of 1.5 well-rounded smooth turns. The rest of the whorls are marked by rather strong axial ribs, which are about as wide as the spaces that separate them. They are very regular on the early turns but become less so on the last whorl owing to the additional wrinkled sculpture. Beginning with the fourth turn, rather large, feebly developed, and irregularly distributed wrinkles, which fade out on the last part of the last turn, make their appearance. These wrinkles are best emphasized below the appressed summit. Suture strongly impressed on all but the last turn where the summit creeps up on the preceding turn and forms a cord. Periphery well rounded and marked by the wrinkling characteristic of the upper surface of the last turn. Base inflated, strongly rounded, moderately broadly, openly umbilicated and marked by a series of very strong, oblique, retractively slanting, short cords, which radiate from the outer edge of the umbilicus, but do not reach the middle of the base. The spaces separating these cords are not quite as wide as the cords. The rest of the base is feebly malleated. The umbilical wall is marked by obsolete ribs, which are the continuation of the strong oblique cords mentioned above. These, as well as their interspaces, are crossed by incremental lines. Aperture circular, oblique, decidedly protracted into a clawlike element at the posterior angle; the outer lip of the peristome is excavated below the summit and protracted on the middle, thin at the edge, with the inner lip thickened. Operculum typically cyclopilsbryid.

The specimen figured is one of two, U.S.N.M. No. 356099, received from C. B. Adams. It has 5.5 whorls and measures: Height, 19.2 mm.; greater diameter, 23.8 mm.; lesser diameter, 17.3 mm. It is without specific locality label.

The species appears confined to the south side of Westmoreland Parish, Jamaica, east of Savanna la Mar.

CYCLOPILSBRYA (CYCLOPILSBRYA) HENDERSONI, new species

PLATE 12, FIGURES 21–23

Shell very small, helicoid. Nuclear whorls pale; the succeeding whorls reddish; the last one yellowish, covered with a thin yellowish periostracum. The nucleus consists of 1.5 well-rounded smooth turns. The postnuclear whorls are inflated, strongly rounded, and marked by rather irregular wrinkled axial riblets. In addition to this, beginning with the second half of the first postnuclear whorl, wrinkles irregular in size and distribution make their appearance. These are rather coarse, particularly so on the last whorl. Suture well impressed, a little less so on the last part of the last whorl. Periphery well rounded and marked by the continuation of the wrinkles. Base inflated, strongly rounded, openly umbilicated with a low keel marking the outer edge of the umbilicus. The entire base is marked by very strong wrinkles, which almost assume the form of nodules, the spaces between them being strongly impressed pits. The umbilical wall is marked by coarse, low, rounded, broad ribs which in turn are crossed by the incremental lines. Aperture circular, protracted into an angle at the posterior angle; outer lip of the peristome thin, the inner rather thickened. Operculum typically cyclopilsbryid.

The type, U.S.N.M. No. 57764, was received from C. B. Adams. It has 4.9 whorls and measures: Height, 9.9 mm.; greater diameter, 14.2 mm.; lesser diameter, 11.0 mm.

No definite locality accompanies this specimen, but the same species was obtained by Henderson near Kings, Westmoreland Parish, Jamaica, which is the only locality we have for it. Kings is on the south coast of Westmoreland near the boundary of St. Elizabeth Parish.

CYCLOPILSBRYA (CYCLOPILSBRYA) GLENBURNIENSIS, new species

Plate 12, Figures 18–20

Shell large, helicoid, the denuded specimens soiled yellowish white. The nucleus consists of almost 1.5 well-rounded smooth turns. The postnuclear whorls are well rounded and marked by retractively curved, closely approximated, rather broad axial riblets, which are quite regular on the early whorls but become sinuous and slightly irregular on the last whorl. Beginning with the middle half of the penultimate whorl wrinkles make their appearance. These gain in strength with the increasing whorls, but again fade out on the last one-tenth of the last turn. These wrinkles are irregular in strength and distribution and extend in a more or less zigzag pattern from the summit toward the periphery in the best-developed portion. Suture well impressed except on the last half of the turn, which creeps up on the preceding whorl. Periphery well rounded. Base strongly rounded, moderately broadly openly umbilicated, with a very strong keel marking the outer edge of the umbilicus. The umbilical side of this keel is limited by a decided excavation. On the outside a series of rather distantly spaced, protractively curved, short, stout riblets radiate from the keel, leaving broad impressed pits between them. These riblets do not extend over more than one-third of the base; the rest of the base is marked by incremental lines and slight pittings. Aperture circular, protracted into a clawlike element at the posterior angle; outer lip of the peristome thin, the inner somewhat thickened, particularly so at the umbilical keel. Operculum typically cyclopilsbryid.

The type, U.S.N.M. No. 535965, was collected by Orcutt on Glenburnie Mountains, Westmoreland Parish, Jamaica. It has 5.3 whorls and measures: Height, 19.2 mm.; greater diameter, 26.5 mm.; lesser diameter, 19.4 mm.

Four additional lots from the immediate type locality are in the collection of the National Museum.

The profound pits outside of the umbilical keel readily distinguish this species from *C.* (*C.*) *rupisfontis* (Chitty), which it most nearly resembles.

CYCLOPILSBRYA (CYCLOPILSBRYA) RUPISFONTIS (Chitty)

Plate 12, Figures 24–26

1857. *Cyclotus rupisfontis* Chitty, Proc. Zool. Soc. London, vol. 25, p. 155.
1898. *Neocyclotus* (*Plectocyclotus*) *rupisfontis* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 139, reprint.

Shell of medium size, elevated helicoid, covered with a dark chestnut-brown periostracum except the region immediately below the summit, which is buff. There are also frequently spiral lines of the buff coloration on the last part of the last turn. The nucleus consists of 1.3 well rounded, smooth turns. The postnuclear whorls are inflated, strongly rounded; the first is marked by very regular, strongly elevated axial riblets, which are separated by spaces about as wide as the riblets. Beyond this turn the axial sculpture becomes irregular and the riblets become more or less sinuous on the next whorl, while on the last whorl they are very sinuous and the individuals vary materially in strength from the summit to the periphery, forming in fact a series of jointed slight wrinkles. In addition to this, there are heavy wrinkles on the last whorl, which are also irregular and slope in a general, slightly protractive direction. They are strongest on the middle of the turns and weaken toward the summit and the periphery and lend to the last whorl an irregularly nodulose aspect. Suture well impressed except on the last turn, which creeps very strongly up on the preceding turn, to which it is appressed, leaving a slight concave area below its summit. Periphery well rounded. Base inflated, strongly rounded, rather narrowly umbilicated, provided with a strong keel at the outer edge of the umbilicus. On the umbilical side the keel is strongly inpinched, while on the outside there is scarcely any impression. The umbilical keel itself is rendered rough by the incremental lines and immediately outside of this there are a few faint obsolete pits. The rest of the base is almost smooth or at best exceedingly faintly, irregularly, obsoletely nodulose. Aperture circular, protracted into a decidedly clawlike element at the posterior angle; outer lip of the peristome thin, the inner thickened, particularly so at the junction with the basal keel. Operculum typically cyclopilsbryid.

The specimen figured, Acad. Nat. Sci. Philadelphia, No. 174130, is one of a series collected by Dr. H. B. Baker on the hills north of Retreat, Westmoreland Parish, Jamaica. It has 5 whorls and measures: Height, 19.0 mm.; greater diameter, 24.3 mm.; lesser diameter, 18.0 mm. It resembles most closely *C.* (*C.*) *glenburniensis*, from which the feeble basal sculpture will readily differentiate it.

The species is found on both sides of the boundary on the south side of Westmoreland and St. Elizabeth Parishes.

CYCLOPILSBRYA (CYCLOPILSBRYA) STRIOSA (Chitty)

Plate 12, Figures 27–29

1857. *Cyclotus jugosus striosus* Chitty, Proc. Zool. Soc. London, vol. 25, p. 156.

Shell very small, decidedly depressed-helicoid; the early whorls reddish, gradually changing to wax yellow on the last turn. The nucleus consists of about 1.5 strongly elevated smooth turns; the succeeding whorls are marked by strongly elevated axial ribs, which are not quite so wide as the spaces that separate them, and which on the last turn are most conspicuous on the oblique wrinkles. Beginning with the last whorl, rather rough, decidedly obliquely retractively slanting cords, which are about as wide as or a little wider than the spaces that separate them, make their appearance. These cords are well elevated and extend enfeebled to the summit. Near the summit they assume a little more vertical direction. Suture strongly constricted, even on the last whorl. Periphery well rounded and marked by the sculpture of the spire. Base inflated, strongly rounded, very openly umbilicated, with the merest indication of an umbilical keel. The strong oblique cords described for the spire extend over the entire base and pass down on the umbilical wall as less strong riblets. Aperture circular, slightly angulated at the posterior angle; outer lip of the peristome thin; the inner is slightly thickened. Operculum typically cyclopilsbryid.

The specimen figured, U.S.N.M. No. 168515, is one of a lot collected by Henderson and Simpson at Ipswich in the northwestern part of St. Elizabeth Parish, Jamaica. It has 4.5 whorls and measures: Height, 9.3 mm.; greater diameter, 14.4 mm.; lesser diameter 10.8 mm.

We have many additional lots collected by Charles R. Orcutt from the same general region.

The small size and the depressed-helicoid form will differentiate this from all the other members of the genus.

CYCLOPILSBRYA (CYCLOPILSBRYA) JUGOSA (C. B. Adams)

PLATE 12, FIGURES 33–35; PLATE 42, FIGURES 11–13

1852. *Cyclostoma jugosum* C. B. ADAMS, Ann. Lyc. Nat. Hist. New York, vol. 5, p. 59.

1852. *Cyclotus jugosus* PFEIFFER, Monographia pneumonopomorum viventium, vol. 1, p. 27.

1857. *Cyclotus jugosus parva* CHITTY, Proc. Zool. Soc. London, vol. 25, p. 156.

1898. *Neocyclotus* (*Plectocyclotus*) *jugosus* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

Shell very large, decidedly depressed-helicoid, almost planorbid, covered with a pale brown periostracum. The nuclear whorls are flesh colored, the succeeding whorls reddish, gradually paling to flesh color. The nucleus consists of 1.6 inflated, well-rounded, smooth whorls. The succeeding turns are marked by strongly elevated, slender, very regular, slightly retractively curved axial riblets, which are about one-third as wide as the spaces that separate them. On the last turn and a half strong wrinkles make their appearance, which are arranged in a peculiar zigzag pattern, the zigzagging being very broad. These wrinkles are about as wide as the spaces that separate them. On the last half of the last turn the zigzag arrangement becomes less conspicuous and the sculpture assumes more the character of nodulation. Suture well impressed on all the turns. Periphery well rounded and marked by the continuation of the sculpture of the spire. Base inflated, strongly rounded, and marked with strong oblique cords near the umbilicus, which have a protracted slant. The rest of the base is marked by finer irregular cords, which are irregularly distributed but very strongly developed. Umbilicus broad and open. The umbilical wall is marked by strong, almost sublamellar axial riblets and lines of growth. Aperture circular, oblique, slightly protracted at the posterior angle; outer lip of the peristome thin at edge, the inner somewhat thickened. Operculum typically cyclopilsbryid.

The specimen figured, U.S.N.M. No. 100685, is one of a large series collected by Orcutt between Ipswich and Springfield, near the 4-mile milestone, St. Elizabeth Parish, Jamaica. It has 5.1 whorls and measures: Height, 16.7 mm.; greater diameter, 27.8 mm.; lesser diameter, 20.4 mm.

This species is readily distinguished from *C.* (*C.*) *striosa* (Chitty) by its very large size and irregular cording of the base. Chitty described this as *Cyclotus jugosus parva.* We find that the size of this species varies very greatly, and that specimens meeting all the requirements of Chitty's *parva* may be found in any of the colonies. They merely represent individual variation, not zoogeographic races.

This species is distributed through western St. Elizabeth Parish and the adjacent region of Westmoreland Parish.

CYCLOPILSBRYA (CYCLOPILSBRYA) CARIBAEA (Clench and Aguayo)

Plate 13, Figures 43–45

1843. *Cyclostoma corrugatum* G. B. Sowerby, Proc. Zool. Soc. London, vol. 11, p. 30 (not *Cyclostoma corrugatum* Menke, Synopsis methodica molluscorum . . . p. 39, 1830).

1935. *Poteria caribaea* Clench and Aguayo, Nautilus, vol. 49, p. 51, pl. 3, figs. 5, 6.

Shell large, helicoid. The nuclear whorls are pale brown, while the succeeding turns are chestnut-brown, gradually fading to flesh color. The nucleus consists of 1.5 well rounded, smooth turns. The postnuclear whorls are inflated, strongly rounded, all but the last 1.5 turns marked by slender, rather weak and moderately distantly spaced, slightly retractive axial riblets. The last 1.5, in addition to this sculpture, are marked by strong wrinkles, which are very strong near the summit and there almost vertical in position; below this there are oblique wrinkles, which are arranged in a more or less ill-defined zigzag fashion. Suture strongly impressed except on the last turn, which is slightly appressed to the preceding turn. Periphery strongly rounded and marked by the continuation of the axial sculpture. Base inflated, strongly rounded, with very coarse, oblique, protractively slanting wrinkled cords, which radiate from the outer edge of the umbilicus toward the periphery, weakening somewhat toward the periphery. The base is rather narrowly openly umbilicated and the umbilical wall is marked by coarse, almost lamellar axial riblets and fine lines of growth. Aperture circular, slightly protracted into an angle at the posterior angle; outer lip thin, the inner somewhat thickened. Operculum typically cyclopilsbryid.

The specimen figured is one of a lot, U.S.N.M. No. 535696, collected by B. W. Oruda at Spring Mount, St. James Parish, Jamaica, and received from the Museum of Comparative Zoology. It has 5 whorls and measures: Height, 16.8 mm.; greater diameter, 24.8 mm.; lesser diameter, 18.0 mm.

This species was first recognized by G. B. Sowerby, who called it *Cyclostoma corrugatum;* that name being preoccupied by Menke's *corrugatum*, the adoption of Clench and Aguayo's name *caribaea* becomes necessary.

The species is rather widely distributed, ranging through Hanover, Westmoreland, St. James, and St. Elizabeth Parishes.

CYCLOPILSBRYA (CYCLOPILSBRYA) RUFILABRIS (Chitty)

PLATE 13, FIGURES 1–3

1857. *Cyclotus jugosus rufilabris* CHITTY, Proc. Zool. Soc. London, vol. 25, p. 156.

Shell small, helicoid. Nuclear whorls flesh colored, the succeeding rose red, the rest brown with a reddish flush; aperture red. The nucleus consists of a little more than a well-rounded, smooth turn. The postnuclear whorls are marked by rather closely spaced, poorly developed, slightly retractively curved axial riblets. Beginning with the last half of the penultimate whorl irregular wrinkles make their appearance. These are strongest immediately anterior to the summit, where they appear as groups of heavy broad nodules. Anterior to this the finer cords, which are decidedly oblique and irregular, are present. Suture well impressed on all the whorls except the last part of the last, in which the summit creeps up on the preceding turn. The periphery is well rounded and marked by the continuation of the sculpture of the spire. Base inflated, strongly rounded, with very strong, protractively curved, oblique wrinkles, which are separated by spaces as wide as the wrinkles. These do not extend to the periphery, but fade out toward the middle of the base, the anterior part being sculptured like the upper surface. The umbilicus is not very broad and its wall is marked by rather strong axial ribs, which, like the spaces between them, bear fine incremental lines. Aperture circular, decidedly oblique, protracted into an angle at the posterior angle; outer lip of the peristome thin, the inner somewhat thickened. Operculum typically cyclopilsbryid.

The specimen figured, U.S.N.M. No. 356148, bears the label "Jamaica," without detailed locality. It has 4.5 whorls and measures: Height, 12.2 mm.; greater diameter, 16.8 mm.; lesser diameter, 12.5 mm.

Three additional lots are in the collection of the National Museum. Two of these come from Balaclava, St. Elizabeth Parish, and another from Pepper, St. Elizabeth Parish.

This species resembles most nearly *C.* (*C.*) *asperula* (Sowerby), from which it can readily be distinguished by its stronger sculpture.

CYCLOPILSBRYA (CYCLOPILSBRYA) ASPERULA (Sowerby)

PLATE 13, FIGURES 4–6

1843. *Cyclostoma asperulum* SOWERBY, Thesaurus conchyliorum, vol. 1, p. 91, pl. 23, fig. 3.

1852. *Cyclotus asperulus* PFEIFFER, Monographia pneumonopomorum viventium, vol. 1, p. 21.

1898. *Neocyclotus* (*Plectocyclotus*) *asperulus* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

Shell small, helicoid, flesh colored, with a brownish flush. The nucleus consists of a little more than a single turn, which is well rounded and smooth. The postnuclear whorls are inflated, strongly rounded, and marked by feeble, retractively curved axial riblets, which are about half as wide as the spaces that separate them. On the last 1.5 turns feeble wrinkles make their appearance, which on the last whorl are very regularly developed and distributed. They are not very prominent even here. Suture moderately strongly impressed. Periphery strongly rounded. Base inflated, strongly rounded, very narrowly umbilicated, marked by wrinkles, pits, and nodules. The umbilical wall is marked by slender riblets and lines of growth. Aperture circular, oblique, protracted into a clawlike element at the posterior angle; outer lip of the peristome thin, the inner somewhat thickened. Operculum typically cyclopilsbryid.

The specimen figured, U.S.N.M. No. 474033, bears the label "Jamaica," without definite locality designation. It has 4.6 whorls and measures: Height, 12.3 mm.; greater diameter, 16.2 mm.; lesser diameter, 12.5 mm.

This species resembles in size and shape *C.* (*C.*) *rufilabris* (Chitty), from which it can be easily differentiated by its weak sculpture.

Two additional specimens in our collection are also without locality designation.

CYCLOPILSBRYA (CYCLOPILSBRYA) BESWICKI (Chitty)

1857. *Cyclotus beswicki* Chitty, Proc. Zool. Soc. London, p. 157.
1898. *Neocyclotus* (*Plectocyclotus*) *beswicki* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

I have not seen this species, so I quote Chitty's description:

"*Form*, subglobose-conic. *Colour*, pinkish, with light brown epidermis. *Sculpture*, very coarse lines of growth, very slight distant corrugation on the last whorl, coarser below; fine lines of growth within umbilical keel. *Spire*, well elevated, with almost straight outlines. *Whorls*, 5¼, moderately rounded, with moderate suture. *Aperture*, oblique and much dilated to the right below, depressed above. *Peritreme*, slightly sinuate above, sharp on the right. *Umbilicus*, moderate, greatest width 0.25 [6.25 mm.]. *Umbilical keel*, strongly produced. *Operculum*, with lamina of about 9 much incurved close spiral whorls, which are very slightly concave on the entire margins; end of last a little incurved to preceding one. Height 0.75 [18.75 mm.]; greatest breadth 0.9 [22.5 mm.]; least breadth 0.74 [18.50 mm.].

"Bogue Estate, north-east corner of St. Elizabeth."

CYCLOCAYMANIA, new subgenus

In this subgenus the spiral lamella is curved inward to the very edge, but attached to its free edge on the later turns is a broad fold, which extends in a curve downward and outward to almost meet the next whorl.

Type: *Poteria caymanensis* Pilsbry=*Cyclopilsbrya* (*Cyclocaymania*) *caymanensis* (Pilsbry).

KEY TO THE SPECIES OF SUBGENUS CYCLOCAYMANIA

Shell rugose.	
Umbilicus wide	**caymanensis**
Umbilicus narrow	**fonticula**
Shell not rugose	**laevitesta**

CYCLOPILSBRYA (CYCLOCAYMANIA) CAYMANENSIS (Pilsbry)

Plate 13, Figures 7–9, 10–12 type

1930. *Poteria caymanensis* Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, vol. 82, pl. 18, figs. 4, 5.

Shell small, depressed-helicoid, flesh colored when the periostracum is removed. Nuclear whorls 1.5, well rounded, smooth. Postnuclear whorls well rounded; the first with axial riblets, the rest with axial riblets which are less regular and toward the end become obsolete and decidedly irregular. On the middle of the postnuclear whorls there are decidedly obliquely retractively slanting rugae, which, combined with the axial sculpture, produce a decidedly rough surface. On the last part of the last turn the rugae almost disappear and the whorl, while still rough, is not as conspicuously patterned. Suture well impressed. Aperture rounded. Base openly umbilicated with a very strong carina marking the outer limits of the umbilicus. Within the umbilicus the shell is inpinched above the keel. The surface of the base has the rugations very strongly marked and here they appear quite regular and separated by spaces a little narrower than the raised ridges. The axial threads of growth here also are less pronounced, while on the umbilical wall the axial riblets are more emphasized. Aperture decidedly oblique, somewhat peaked at the posterior angle; peristome moderately thickened. The last whorl is slightly descending and the peristome is therefore rendered free. Operculum?

Dr. H. A. Pilsbry collected the type and the paratype of this species 1 mile south of Georgetown, Grand Cayman. They constitute Acad. Nat. Sci. Philadelphia No. 150857. The type has 4.5 whorls and measures: Height, 8.7 mm.; greater diameter, 14.0 mm.; lesser diameter, 11.0 mm. The paratype has lost the early whorls. It measures: Height, 10.6 mm.; greater diameter, 16.2 mm.; lesser diameter, 12.8 mm.

CYCLOPILSBRYA (CYCLOCAYMANIA) FONTICULA (Preston)

PLATE 13, FIGURES 13–18; PLATE 42, FIGURES 6–7

1911. *Neocyclotus fonticulus* PRESTON, Proc. Malac. Soc. London, vol. 9, p. 359, fig.

Shell small, helicoid, covered with a wood-brown periostracum. Nuclear whorls 1.2, small, well rounded, smooth. Postnuclear whorls strongly rounded, the first turn marked by slender, retractively curved axial riblets. Beyond this the axial riblets give way to semilamellar, more or less closely spaced, irregularly developed, retractively slanting axial elements. These are rendered rough and more or less wavy by retractively curved, broad rugae, which on the last part of the last turn become enfeebled and almost vanish toward the aperture. Suture strongly impressed. Periphery well rounded. Base moderately well rounded, limited at the umbilicus by a very heavy keel. The base is sculptured by the continuation of the fine axial lamellae and by very strong, retractively curved, quite regular and regularly spaced cords, which are separated by grooves a little less wide than the cords. The base is openly umbilicated, the umbilicus being about one-third the width of the greater diameter of the shell. The umbilical wall appears excavated above the bounding keel and is marked by the axial lamellation only. In apparently very old, senescent individuals, the last whorl descends near the aperture. In a majority of specimens, however, this is not the case. Aperture decidedly oblique, subcircular. In the specimens where the last whorl is adnate to the preceding turn, the attachment to the parietal wall terminates in a lunate line and the peristome is protracted into a decided point at the posterior angle. In specimens where the last whorl is descending, the aperture becomes more nearly circular and the posterior angle shows a carina on the outside. Peristome simple; the outer lip thin; the inner lip, however, is materially thickened. Operculum typically cyclocaymanid.

Preston's type shows the senescent state, and I am figuring two specimens, one corresponding to his figure, and another showing the more prevalent phase. These have 4.9 and 4.8 whorls, respectively, and measure: Height, 10.0, 9.1 mm.; greater diameter, 14.5, 14.6 mm.; lesser diameter, 11.5 and 11.0 mm., respectively.

These were selected from a large series of specimens, U.S.N.M. No. 466831, collected by T. Savage English on Grand Cayman Island, without specific locality.

Dr. H. A. Pilsbry obtained this species in the woods southwest of North Sound, and I found a dead specimen, U.S.N.M. No. 392278, at the church between St. George and Bowdentown.

CYCLOPILSBRYA (CYCLOCAYMANIA) LAEVITESTA (Pilsbry)

PLATE 13, FIGURES 22–24

1930. *Poteria laevitesta* PILSBRY, Proc. Acad. Nat. Sci. Philadelphia, vol. 82, pp. 227–228, pl. 16, figs. 18, 18a, 19, 19a.

Shell small, helicoid, covered with a honey-yellow periostracum. Nuclear whorls 1.4, small, well rounded, smooth. The postnuclear whorls are well rounded, the first marked by very regular, retractively slanting axial riblets, which are not quite so wide as the spaces that separate them. After this the riblets become less regular and more inclined to be lamellose and closely approximated, which render the surface of the spire rather rough but without rugations. Suture moderately constricted. Periphery almost angulated. Base short, well rounded, marked like the spire with indications of fine spiral lirations. A strong keel forms the umbilical angle. The umbilical wall is excavated above this keel. The base also is devoid of rugations. The umbilicus is about one-fourth the diameter of the shell. Aperture decidedly oblique, protracted at the posterior angle into an almost spurlike element. Peristome simple, outer lip thin; inner lip decidedly thickened. Operculum typically cyclocaymanid.

The specimen described and figured, Acad. Nat. Sci. Philadelphia No. 150658, is a paratype collected by Charles B. Taylor on Grand Cayman. It has 4.6 whorls and measures: Height, 11.5 mm.; greater diameter, 16.5 mm.; lesser diameter, 13.5 mm.

Genus PTYCHOCOCHLIS Simpson

1895. *Ptychocochlis* SIMPSON, Proc. U. S. Nat. Mus., vol. 17, p. 431.

Simpson replaces *Platystoma* Klein, several times preoccupied, with the name *Ptychocochlis* and cites as type *Neocyclotus jamaicensis* Chemnitz, rechristened orthodoxly by Menke in 1830 as *Cyclostoma corrugatum.* The type of *Ptychocochlis* Simpson is *Ptychocochlis corrugata* (Menke) = *Turbo jamaicensis* Chemnitz, Conchylien Cabinet, vol. 11, pp. 277–278, pl. 209, figs. 2057, 2058, 1795 (nonbinomial) rechristened in 1830 as *Cyclostoma corrugatum* Menke, Synopsis methodica molluscorum * * *, p. 39.

This genus is differentiated from *Poteria* by having the elevated lamellae of the operculum expanded at the summit to resemble the capital letter T or L inverted, the outer limb of the cross bar being much longer than the inner and touching that of the succeeding whorl, thus forming a complete deck.

Type: *Cyclostoma corrugatum* Menke = *Ptychocochlis corrugata* (Menke).

The radulae of *Ptychocochlis clappi*, *P. martensi* (Kobelt), and *P. savannensis* show the formula 3:3:3:3. The jaw is without a median projection. The verge of *P. vendreysi* is situated on the back of the neck behind the tentacles. It is swollen basally and provided with a seminal groove and a very short simple terminal appendage.

KEY TO THE SPECIES OF THE GENUS PTYCHOCOCHLIS[4]

- Nodulations present on base.
  - Nodulations on base strong.
    - Strong nodulations of base extending from umbilical keel to periphery.
      - Strong nodulations present on base of all of last whorl.
        - Upper side of last whorl very coarsely wrinkled ----- corrugatior
        - Upper side of last whorl not very coarsely wrinkled.
          - Wrinkles of base coarse ----- gossei
          - Wrinkles of base fine.
            - Shell more than 20 mm. in diameter ----- varians
            - Shell less than 14 mm. in diameter ----- gemma
      - Strong nodulations present on base of early portion of last whorl only.
        - Nodulations strong on all the upper surface of last whorl.
          - Umbilical keel strong ----- welchi
          - Umbilical keel obsolete ----- manchesterensis
        - Nodulations not strong on all the upper surface of last whorl but obsolete on last part.
          - Nodulose ridges retractively slanting at periphery ----- taylori
          - Nodulose ridges protractively slanting at periphery.
            - Nodulations coarse ----- zigzag
            - Nodulations finer ----- shawae
    - Strong nodulations of base not extending from umbilical keel to periphery.
      - Nodulations of upper surface of last whorl few and distantly spaced ----- clappi
      - Nodulations of upper surface of last whorl not few or distantly spaced.
        - Shell gigantic, greater diameter more than 32 mm ----- senex
        - Shell not gigantic, greater diameter 27 mm. or less.
          - Nodulations on base very strong ----- corrugata
          - Nodulations on base not very strong ----- adamsi
  - Nodulations on base feeble.
    - Oblique, protractively curved wrinkles present near umbilical keel ----- simpsoni
    - Oblique, protractively curved wrinkles absent near umbilical keel.
      - Weak nodules present on upper surface of all of last whorl.
        - Nodules on base weak ----- martensi
        - Nodules on base obsolete.
          - Umbilicus wide ----- hendersoni
          - Umbilicus narrow ----- marianna

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[4] I have not included *P. subrugosa* (Sowerby) in this key, since I have not seen specimens of it.

  - Weak nodules not present on the upper surface of all of last whorl.
    - Penultimate whorl with obliquely curved wrinkles.
      - Wrinkles retractively curved on anterior half of whorl ---- **lacteofluvialis**
      - Wrinkles protractively curved on anterior half of whorl.
        - Nodulose sculpture strong ---- **savannensis**
        - Nodulose sculpture weak ---- **orcutti**
    - Penultimate whorl without obliquely curved wrinkles.
      - Wrinkles on penultimate whorl arrow-shaped.
        - Arrow-shaped wrinkles pointing forward ---- **minor**
        - Arrow-shaped wrinkles pointing backward.
          - Shell decidely elevated ---- **magna**
          - Shell not decidedly elevated ---- **montegoensis**
      - Wrinkles on penultimate whorl not arrow-shaped.
        - Umbilicus very narrow ---- **vendreysi**
        - Umbilicus not very narrow ---- **subglobosa**
- Nodulations absent on base ---- **campeachyi**

PTYCHOCOCHLIS CORRUGATIOR (Chitty)

Plate 13, Figures 37–39

1857. *Cyclotus corrugatior* Chitty, Proc. Zool. Soc. London, vol. 25, p. 149.
1899. *Neocyclotus* (*Plectocyclotus*) *corrugatior* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 31, p. 136.

Shell of medium size, depressed-helicoid. Nuclear whorls flesh colored, the succeeding turns wood brown, the last one paler, with the summit of the corrugations lighter than the rest of the shell. Peristome and interior soiled bluish white. The nucleus consists of about 1 smooth well-rounded turn. The first 1¼ postnuclear turns are well rounded and marked by slightly retractively curved axial riblets, which are about half as wide as the spaces that separate them. The succeeding turns are also strongly rounded and marked by the continuation of the axial riblets, which here are rendered irregularly disposed by the strong rugations. Beginning with the third whorl and extending over the remaining turns, except the last half of the last whorl, strongly raised, decidedly oblique, protractively slanting ridges make their appearance. These ridges extend to about one-fourth of the distance between the summit and the periphery anterior to the summit. They are rendered slightly nodulose by the axial riblets. The last half of the last turn is marked by nodules, which are not of uniform strength or spacing, or the direction of slant. These are also rendered more finely nodulose by the crossing axial riblets. The suture of all but the last half turn is deeply impressed. In the last half turn the summit of the whorls is appressed to the preceding turn. Periphery well rounded. Base well rounded, openly umbilicated, and provided with a strong keel at the outer limit of the umbilicus. The space between the umbilical keel and the periphery is marked by raised, retractively slanting ridges, which join those on the upper portion of the whorl, but here have the reverse slant. They are not quite so strong as those on the upper surface and they weaken in strength toward the umbilical keel. In addition to this, strong incremental lines representing the continuation of the finer axial riblets are present. The umbilical wall is marked by crowded, rather rough axial riblets and incremental lines. Aperture subcircular, slightly angulated at the posterior angle where it is also somewhat protracted; the outer peristome is strongly evenly curved; the inner slightly thickened at the umbilical keel. Operculum typically ptychocochlid.

The specimen figured has 5 whorls and measures: Height, 13.5 mm.; greater diameter, 21.2 mm.; lesser diameter, 15.9 mm. It is one of the specimens in the Adams collection at Amherst College, and the label states that it came from Gutters and was donated by Chitty.

The species centers in Manchester Parish, Jamaica, but it also extends into Clarendon to the east and the eastern part of St. Elizabeth and to the north into St. Ann Parish.

PTYCHOCOCHLIS GOSSEI, new species

PLATE 13, FIGURES 34–36

Shell rather large, helicoid. The nucleus and early postnuclear turns are almost blood-red; the rest unicolor, chestnut-brown, or banded. In the type there is a white band immediately below the summit and a broad light zone extending from the periphery to the middle of the base, and finer paler lines on the anterior portion of the base, which is also of a paler tint than the upper surface. The nucleus consists of a single, well-rounded, smooth turn. The postnuclear whorls are strongly rounded. The first postnuclear whorl is marked by slender, retractively curved axial riblets, which are not quite as wide as the spaces that separate them. These fine riblets continue over the rest of the whorls, becoming a little heavier and decidedly irregular in distribution on the last whorl. On the second postnuclear whorl the beginning of the decidedly oblique, protracted ridges make their appearance. These become intensified as the shell increases in size, and on the penultimate whorl they are about as wide as the spaces that separate them. They do not extend on the anterior fourth of the whorls and on the last half of the last whorl they become much enfeebled. They are never as pronounced as in *P. corrugatior* (Chitty). On all the whorls, except the last, the suture is well impressed; on the latter the summit is appressed to the preceding turn. Periphery well rounded. Base strongly rounded, moderately broadly openly umbilicated, with a strong broad keel limiting the outer termination of the umbilicus. The posterior half of the base is decidedly wrinkled, almost to the very edge of the peristome. On the anterior half the wrinkling is almost absent. The umbilical keel is rendered somewhat notched by the axial sculpture. The umbilical wall is marked by fairly strong axial riblets and lines of growth. Aperture subcircular, angulated at the posterior angle and slightly effuse at the junction of the basal and outer lip. The outer lip is thin; the inner, somewhat thickened. Operculum typically ptychocochlid.

The type, U.S.N.M. No. 398343, is one of a series collected by Orcutt at Hermitage Dam, Jamaica, that is, on the main road between Constant Spring and Stony Hill, St. Andrew. It has 5 whorls and measures: Height, 18.7 mm.; greater diameter, 25.2 mm.; lesser diameter, 18.8 mm.

The larger size, less open umbilicus, and more elevated form, as well as the feebler nodulation, will readily distinguish this species from *P. corrugatior*.

PTYCHOCOCHLIS VARIANS (C. B. Adams)

PLATE 13, FIGURES 40–42

1852. *Cyclostoma varians* C. B. ADAMS, Ann. Lyc. Nat. Hist. New York, vol. 5, p. 59.

1852. *Cyclotus varians* PFEIFFER, Monographia pneumonopomorum viventium, Suppl. 1, p. 27.

1898. *Neocyclotus* (*Plectocyclotus*) *varians* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 139, reprint.

Shell of medium size, soiled flesh colored, covered by a pale brown periostracum. The nuclear whorls appear to vary from flesh colored to reddish. The nucleus consists of a little more than a turn, which is smooth and well rounded. The postnuclear whorls are strongly rounded; the first is marked by slender, retractively curved axial riblets, which are not quite so wide as the spaces that separate them. Beginning with the second postnuclear whorl, strong, oblique, protractively curved ridges make their appearance. These continue to the early part of the last whorl. These ridges do not extend quite to the summit but stop at about one-fourth of the distance between the summit and periphery, anterior to the summit. The spaces separating these ridges are about equal to the ridges. They, as well as the ridges, are crossed by the slender axial riblets. On the last whorl the oblique ridges gradually disappear and are replaced by irregular wrinkles that appear to be without definite direction. This sculpture extends almost to the peristome. The suture is well impressed on all but the last turn, which is appressed at the summit. Periphery well rounded. Base strongly rounded, openly moderately broadly umbilicated with a strong keel bounding the outer edge of the umbilicus. The entire surface of the base is marked by irregularly disposed wrinkles and pits. The umbilical keel is rendered rather rough by the incremental lines, which extend strongly and roughly into the umbilicus. Aperture subcircular, rather strongly protracted into an angle at the posterior angle; outer peristome thin, the inner somewhat thickened. Operculum typically ptychocochlid.

The specimen figured is one of C. B. Adams' original lot, No. 6. This was selected by H. B. Baker [5] as the type of Adams' complex. It has 5 whorls and measures: Height, 14.6 mm.; greater diameter, 20.8 mm.; lesser diameter, 15.6 mm. No specific locality accompanies this lot.

The species appears restricted to the north coast of Jamaica in St. Mary and St. Ann Parishes, that is, the stretch between Port Maria and Ocho Rios Bay.

PTYCHOCOCHLIS GEMMA (Chitty)

PLATE 13, FIGURES 25–27

1857. *Cyclotus gemma* CHITTY, Proc. Zool. Soc. London, vol. 25, p. 150.
1898. *Neocyclotus* (*Plectocyclotus*) *gemma* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

Shell small, depressed-helicoid, pale horn colored. The nucleus consists of a single well-rounded, smooth turn. The postnuclear whorls are well rounded; the first is marked by slender, retractively curved axial riblets, which are about as wide as the spaces that separate them. The second postnuclear whorl shows the beginning of oblique wrinkles, which are not quite as wide as the spaces that separate them. On the last whorl these wrinkles assume an irregular distribution, the spaces between them being a little wider than the wrinkles. These rugations do not extend quite to the summit. Suture well impressed in all the turns. Periphery well rounded. Base broadly openly umbilicated, marked by very strong, rough, decidedly oblique, protracted cords, which are wider than the spaces that separate them and are rendered roughened by the axial riblets. The umbilical keel is but feebly expressed, and the umbilical wall is marked by closely spaced axial riblets. Aperture circular, slightly angulated at the posterior angle, oblique; peristome thin. Operculum typically ptychocochlid.

The specimen figured is C. B. Adams' unique type in the Amherst College collection, received from Chitty, and is said to have come from Burnt Hill, Westmoreland Parish, Jamaica. It is the only specimen that I have seen. It has 4.2 whorls and measures: Height, 7.9 mm.; greater diameter, 12.7 mm.; lesser diameter, 9.0 mm.

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[5] Nautilus, vol. 48, p. 86, 1935.

PTYCHOCOCHLIS WELCHI, new species

Plate 13, Figures 28–30

Shell small, depressed-helicoid, the early whorls red, the rest olivaceous with a chestnut-brown tinge; interior of the aperture bluish white. The nucleus consists of 1.2 well-rounded, smooth turns. The first postnuclear turn is well rounded and marked by poorly developed, somewhat irregularly distributed, feeble axial riblets. On the remaining turns these riblets become more and more irregular owing to the rugate ridges marking the surface. Beginning with the second postnuclear whorl, these ridges gradually develop; they extend from almost at the summit to the periphery and have a decidedly protracted slant. They are not quite as wide as the low spaces that separate them, and are crossed by the slender riblets. Suture strongly constricted. Periphery well rounded. Base openly umbilicated with a moderately strong keel marking its outer limit. The base is marked by weak, retractively curved ridges, which are best developed on the early part of the last turn and become obsolete on the later portion. They are strongest near the periphery. The umbilical wall is marked by strong, fairly coarse riblets. Aperture circular, protracted into a decided angle at the posterior angle. Peristome thin. Operculum typically ptychocochlid.

The type, U.S.N.M. No. 535966, was collected by d'Alté A. Welch at his station A7, at Hardware Gap, St. Andrew Parish, Jamaica. It has 4.2 whorls and measures: Height, 10.6 mm.; greater diameter, 15.0 mm.; lesser diameter, 11 mm.

Nine topotypes are in Dr. Welch's collection. This species suggests *P. manchesterensis*, from which its coarser sculpture on the upper surface, more pronounced umbilical keel, and feebler sculpture of the base will readily distinguish it.

PTYCHOCOCHLIS MANCHESTERENSIS, new species

Plate 13, Figures 19–21

Shell of medium size, helicoid, pale chestnut-brown. Nuclear whorls 1.2, well rounded, smooth. The first postnuclear whorl is strongly rounded and marked by slender, slightly retractively curved, rather closely spaced axial riblets. These axial riblets become stronger and less regular on the succeeding postnuclear turn. On the last whorl they are decidedly sinuous. Beginning with the second postnuclear turn in addition to the axial riblets, the whorls are marked on the anterior two-thirds by decidedly obliquely slanting, protracted ridges, which are less than half the width of the spaces that separate them. Suture strongly impressed. Periphery of the last whorl well rounded. Base broadly openly umbilicated, the outer edge of the umbilicus being marked by an obsolete cord. The base is marked by rather closely spaced, broad, retractively curved, moderately elevated ridges, which are best developed on the early portion of the last turn. On the last portion of the last turn these ridges become obsolete. The umbilical wall is marked by rough riblets and incremental lines. Aperture circular, rather effuse at the junction of the outer and basal lip, and slightly angulated at the posterior angle; peristome thin. Operculum typically ptychocochlid.

The type is one of six specimens, No. 174135, in the collection of the Academy of Natural Sciences of Philadelphia. It was collected by H. Burrington Baker at Belretiro, Manchester Parish, Jamaica. It has 4.5 whorls and measures: Height, 11 mm.; greater diameter, 17.4 mm.; lesser diameter, 13.0 mm.

PTYCHOCOCHLIS TAYLORI, new species

Plate 13, Figures 31–33

Shell of medium size, varying in shape from helicoid to depressed-helicoid, covered with a thin olivaceous periostracum. The nucleus consists of a single smooth, well-rounded turn. The postnuclear whorls are strongly rounded; the first 1.5 are marked by rather weak, slender axial riblets which are rather distantly spaced. On the succeeding turn the axial riblets become irregular, sinuous, and almost narrowly lamellose. Beginning with the second postnuclear whorl and extending to the last half of the last turn, very oblique, protactively slanting ridges are present, which are about as wide as the spaces that separate them. On the last half of the last turn these ridges become very irregular and have the nodules all arranged in a retractive position. Suture well impressed. Periphery well rounded. Base well rounded, openly, rather broadly umbilicated with a rather strong keel at the outer limit of the umbilicus. The early part of the base bears quite strong nodulations, which gradually become weaker toward the end. The umbilical wall is marked by numerous, closely spaced, slender hairlike riblets. Aperture subcircular, oblique, slightly protracted and angulated at the posterior angle; outer peristome thin, the inner peristome is rather thickened.

The type, U.S.N.M. No. 356032, was collected by C. B. Taylor in Upper Clarendon Parish, Jamaica. It has 4.4 whorls and measures: Height, 11.8 mm.; greater diameter, 17.0 mm.; lesser diameter, 13.1 mm.

An additional specimen from the same locality is considerably larger. It has 4.8 whorls and measures: Height, 15.2 mm.; greater diameter, 21.6 mm.; lesser diameter, 16.0 mm.

PTYCHOCOCHLIS ZIGZAG (Chitty)

PLATE 14, FIGURES 13–15

1857. *Cyclotus zigzag* CHITTY, Proc. Zool. Soc. London, vol. 25, p. 150.

1898. *Neocyclotus* (*Plectocyclotus*) *zigzag* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 139, reprint.

Shell of medium size, depressed-helicoid. All our specimens have lost the epidermis, the remaining shell being soiled white. The nucleus consists of a little more than a single well-rounded, smooth turn. Postnuclear whorls strongly rounded; the first is marked by feeble, rather distantly spaced axial riblets. On the succeeding postnuclear whorls the axial riblets become rather irregular, owing to the nodulations; they also become stronger and appear almost lamellose. Beginning with the second postnuclear whorl, nodular ridges make their appearance. These ridges are not so wide as the spaces that separate them and do not extend over the posterior fourth of the turns. They are decidedly obliquely protractively curved. They become obsolete on the last fourth of the last whorl. Suture well impressed. Periphery well rounded. Base openly umbilicated, strongly rounded, provided with a very strong keel marking the outer limit of the umbilicus. This keel is decidedly inpinched on the umbilical side, and a little less so on the outside. The first half of the last turn of the base is strongly nodulose; on the latter part the nodulation becomes enfeebled. The umbilical wall bears numerous axial riblets and fine hairlike incremental lines. Aperture circular, oblique, protracted into a slight angle at the posterior angle. Peristome thin on the outer lip and thickened on the inner. Operculum typically ptychocochlid.

The specimen figured, U.S.N.M. No. 399500, is one of a series collected by C. R. Orcutt in Grays Valley, Trelawny Parish, Jamaica. It has 4.5 whorls and measures: Height, 12.4 mm.; greater diameter, 18.2 mm.; lesser diameter, 13.8 mm.

We have this species from quite a number of localities, all of which are located on the northern rim of Trelawny and the western portion of St. Ann Parishes.

PTYCHOCOCHLIS SHAWAE, new species

PLATE 14, FIGURES 10–12

Shell of medium size, helicoid. The nuclear whorls and first postnuclear turn pale, the succeeding turns chestnut-brown, gradually becoming paler on the last whorl. Base a little paler than the spire. Aperture soiled white with a brownish tinge. The nucleus consists of a single well-rounded, smooth turn. Postnuclear whorls well rounded; the first is marked by slender, decidedly retractively curved, rather closely spaced axial riblets, which are fairly strong. The succeeding turns also have axial riblets, which are less regular, and quite irregular on the last whorl, where they are almost lamellose. In addition to this, beginning with the second postnuclear whorls, there are strong, decidedly retractively slanting ridges that do not extend on the posterior fourth of the turns. These ridges are not quite so wide as the spaces that separate them, and they become obsolete on the last third of the last whorl, where they are replaced by less strong irregular nodulations. Suture strongly impressed. Periphery well rounded. Base well rounded, openly umbilicated, the umbilicus bounded by a strong keel, which is inpinched on both sides. The base is marked on the early portion of the last turn by oblique, retractively slanting ridges, which are replaced on the last half of the turn by irregular wrinkles. The umbilical wall is marked by riblets and fine lines of growth. Aperture circular, oblique, slightly protracted into an angle at the posterior angle. Peristome thin. Operculum typically ptychocochlid.

The type, U.S.N.M. No. 535967, is one of a series of specimens collected by Orcutt at Balaclava, St. Elizabeth, Jamaica. It has 4.8 whorls and measures: Height, 14.0 mm.; greater diameter, 19.8 mm.; lesser diameter, 15.2 mm.

A host of specimens before me appear to confine this species to the Cockpit region of northern St. Elizabeth Parish.

PTYCHOCOCHLIS CLAPPI, new species

PLATE 14, FIGURES 19–21

Shell very large, helicoid, covered with a chestnut-brown periostracum. The nucleus consists of 1.5 well-rounded smooth turns. The postnuclear whorls are well rounded, the early ones separated by a well-marked suture, and the later ones appressed at the summit. The first 1.5 nuclear whorls are marked by slender, slightly retractively curved axial riblets, which are about as wide as the spaces that separate them. Beyond this the nodular ridges gradually make their appearance. These are rather irregular, that is they begin at the summit as retractive elements, then near the middle of the whorl bend forward into protractive ridges, thus producing a somewhat arrow-pointed cone-in-cone effect. This arrangement disappears on the last half of the last turn, where the nodulations become irregular and quite obsolete. On the last fourth of the last whorl, spiral threads make their appearance. The last whorl is strongly constricted below the summit, which causes the posterior portion to appear decidedly appressed to the preceding turn. Periphery well rounded. Base well rounded, openly umbilicated, with a strong keel, which is not only pinched in on the umbilical side, but appears even excavated at this place. On the outside of the keel there is also a depression and here we find strongly developed pits and nodules which extend over the anterior half of the base. The umbilical wall is marked by somewhat irregular riblets and lines of growth. Aperture circular, strongly protracted and angulated at the posterior angle; outer lip of the peristome thin; the inner somewhat thickened. The operculum differs from the typical ptychocochlid in having the outward reflected portion of the whorls not quite touching that of the expanded inner portion of the succeeding turn, thus leaving a slight channel between the two in some of the turns.

The type is one of C. B. Adams' complex of *Cyclostoma varians.* It is part of his No. 7 and is labeled Portland, Jamaica, Agnes Hines, collector.

The type is in the Amherst College collection. It has 5 whorls and measures: Height, 22.8 mm.; greater diameter, 31.4 mm.; lesser diameter, 23.0 mm.

PTYCHOCOCHLIS SENEX, new species

Plate 14, Figures 22–24

This is the largest of the known Jamaican cyclophorids. It has a helicoid shell. The specimen is without periostracum. The nucleus consists of a little more than one turn, which is well rounded and smooth. The postnuclear whorls are well rounded; the first 2.5 are marked by slender, slightly retractively curved, hairlike axial riblets, which are not quite so wide as the spaces that separate them. These are followed by a turn in which very strong, retractively curved ridges are present. On the first half of the last whorl these ridges assume an arrowpoint arrangement, a cone-in-cone type, in which the point of the arrow is almost on the middle of the whorl. On the last half of the last whorl this arrangement becomes obsolete and the shell is marked by strong incremental lines and nodulations near the summit, the senescent last portion appearing strongly denticulated. The suture of the early whorls is well impressed, while on the last turn the summit of the whorls becomes appressed to the preceding turn, and materially creeps up on this. Periphery well rounded. Base well rounded, openly umbilicated with a strong, heavily nodulose keel marking the outer limit of the umbilicus. From this keel there radiates toward the middle of the base a series of heavy ridges which are separated by spaces about as wide as the ridges. These ridges have a protractive slant. They become obsolete on the last fifth of the last whorl. The umbilical wall is marked by coarse ribs, which bear finer hairlike incremental lines. Aperture subcircular, oblique, protracted to form an angle at the posterior angle; peristome moderately thickened all around. Operculum unknown.

The unique type is in the C. B. Adams collection. It measures: Height, 22.4 mm.; greater diameter, 33.4 mm.; lesser diameter, 26.2 mm. It was with Adams' No. 7 of *Cyclostoma varians* collected by Agnes Hines in Portland Parish, Jamaica.

PTYCHOCOCHLIS CORRUGATA (Menke)

Plate 14, Figures 7–9

1795. *Turbo jamaicensis* Chemnitz, Martini-Chemnitz Conchylien Cabinet, vol. 11, p. 277, pl. 209, figs. 2057, 2058 (nonbinomial).
1830. *Cyclostoma corrugatum* Menke (=*Turbo jamaicensis* Chemnitz), Synopsis methodica Molluscorum, p. 39.
1857. *Cyclotus portlandensis* Chitty, Proc. Zool. Soc. London, vol. 25, p. 147.

Shell moderately large, helicoid, chestnut-brown, a little paler on the last whorl, which tends toward buff. The appressed summit of the whorls is also a little paler than the rest of the shell. There is a broad dark band at the periphery, while the anterior portion of the base and the umbilicus are flesh colored with a yellowish tinge, which is also the color of the interior of the aperture. The nucleus consists of a little more than a turn, which is well rounded and smooth. The postnuclear whorls are strongly rounded; the first one and three-quarters are marked by slender, decidedly elevated, and rather distantly spaced, slightly protractively slanting axial riblets. Following this, wrinkles make their appearance. These are arranged in a somewhat arrow-shaped pattern extending retractively over a third of the distance between the summit and the periphery, then bending abruptly protractively toward the periphery. These ridges are about as wide as the spaces that separate them and fade out at the summit, which is appressed to the preceding turn as a ridge. On the last third of the last turn these ridges become decidedly irregular and gradually fade out. On the last turn there is a strong depression a little distance below the summit. On all these ridged whorls the fine axial riblets are well developed, but are rendered irregular and wavy as they cross the nodules of the ridges. On the first two turns the suture is strongly impressed; on the succeeding turn it is rendered less conspicuous by the appression of the summit of the whorls to the preceding turn. Periphery well rounded. Base strongly rounded, openly umbilicated, with a very pronounced keel marking the outer edge of the umbilicus. This keel is separated from the umbilical wall by a deeply impressed groove. On the outside it is less strongly differentiated. The posterior half of the base is more or less smooth, while the anterior portion is marked by protractively curved, strong ridges separated by spaces as wide as the ridges. There are also deep pits at the umbilical keel, which are more or less regularly disposed. The umbilical keel is rendered rough by the incremental elements and the umbilical wall is marked by rough axial riblets and lines of growth. Aperture circular, oblique, decidedly protracted and angulated at the posterior angle; outer lip thin, the inner somewhat thickened. Operculum typically ptychocochlid.

The specimen figured is one of two, U.S.N.M. No. 253665, from Port Antonio, Portland Parish, Jamaica. It has 4.9 whorls and measures: Height, 17.7 mm.; greater diameter, 25.3 mm.; lesser diameter, 18.7 mm.

A large series of specimens before me all come from the north coast of Portland, ranging from Port Antonio westward.

I have been unable to differentiate Chitty's *Cyclotus portlandensis*, even subspecifically, from this species.

PTYCHOCOCHLIS ADAMSI, new species

Plate 14, Figures 4–6

Shell rather large, helicoid, the upper surface chestnut-brown; the lower, paler. Interior of aperture soiled white. The nucleus consists of 1.5 well-rounded smooth whorls. The postnuclear whorls are marked by rather weak somewhat retractively curved axial riblets, which are rather distantly spaced. Beginning with the third postnuclear whorl, weak nodules make their appearance, which extend from the appressed summit to the periphery in a protractive, decidedly oblique slope. This type of sculpture extends over only about half a turn, after which the nodulation becomes irregularly disposed and practically disappears on the last third of the last turn. The suture of the early whorls is very strongly impressed. On the last 1.5 turns the summit of the turns becomes decidedly appressed and projects over the preceding turn so as to form a strong ridge, which renders the suture less conspicuous. On the last whorl there is a decided groove below this appressed portion. Periphery well rounded. Base strongly rounded, openly umbilicated, with a very strong keel marking the outer limit of the umbilicus. This keel is separated by a decidedly impressed groove anteriorly. Posterior to the keel more or less regularly disposed deep pits are present, while the spaces between them extend as oblique short cords toward the periphery; they do not, however, reach the middle of the base. The umbilical wall is marked by coarse riblets and lines of growth. Aperture circular, oblique, protracted into a decided angle at the posterior angle, where it joins the preceding turn as a slight shelf; peristome thin on the outer lip, somewhat thickened on the inner. The operculum is not quite typically ptychocochlid, the outer projection of the expanded summit falling short of reaching the succeeding turns in spots.

The type, from Portland Parish, Jamaica, is one of the C. B. Adams collection at Amherst College. It has 5 whorls and measures: Height, 19.0 mm.; greater diameter, 27.0 mm.; lesser diameter, 19.7 mm.

This species resembles quite closely *P. corrugata* (Menke) but is easily differentiated by its much less strongly developed sculpture and the difference in the operculum noted.

PTYCHOCOCHLIS SIMPSONI, new species

PLATE 14, FIGURES 16–18

Shell of medium size, helicoid, chestnut-brown with the cord at the summit of the last whorl buff. The nucleus consists of a little more than a single low, rounded, smooth whorl. The postnuclear whorls are inflated and strongly rounded; the first one is marked by very slender, slightly retractively curved, weak axial riblets. The second postnuclear whorl shows the beginning of oblique protractive wrinkles which do not quite extend to the summit. This sculpture continues to the last half of the last turn, where it becomes irregular. The entire surface is also marked by incremental lines of more or less irregular strength. Suture strongly impressed on the early whorls, rendered less conspicuous on the last turn by the appressed summit. Periphery well rounded. Base narrowly umbilicated and marked with a moderately strong cord at the outer edge of the umbilicus and a series of feeble protractively slanting ridges adjacent to the umbilical cord, which are separated by spaces about as wide as the ridges. The rest of the base shows an indication of incised spiral lines. The umbilical wall is marked by rather coarse incremental lines. Aperture circular, large, protracted into an angle at the posterior angle; outer lip thin, the inner thickened. Operculum typically ptychocochlid.

The type, U.S.N.M. No. 535968, was collected by Henderson and Simpson at Bog Walk, St. Catherine Parish, Jamaica. It has 4.8 whorls and measures: Height, 15.3 mm.; greater diameter, 21.3 mm.; lesser diameter, 15.5 mm.

Its smaller size and feebler sculpture will differentiate this species from both *P. corrugata* (Menke) and *P. adamsi.* The species seems to be confined to the region of Bog Walk.

PTYCHOCOCHLIS MARTENSI (Kobelt)

PLATE 14, FIGURES 1–3; PLATE 42, FIGURES 8–10

1912. *Neocyclotus* (*Plectocyclotus*) *martensi* KOBELT, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, pt. 3, p. 943, pl. 141, figs. 2–4.

Shell large, helicoid, chestnut-brown; interior of the aperture chestnut-brown. The nucleus consists of about one well-rounded smooth turn. Postnuclear whorls inflated, strongly rounded; the first is marked by slender, retractively curved axial riblets, which are about half as wide as the spaces that separate them. Axial riblets also cover the rest of the whorls, but beyond the first turn they become less regular and tend more toward the formation of slender lamellae. Beginning with the second postnuclear whorl, oblique ridges make their appearance. These ridges are decidedly protractively curved, and are a little narrower than the spaces that separate them. They are strongest on the early turns and gradually fade and disappear on the middle of the spire, after which they are replaced by irregular, low wrinklings and nodulations, as well as malleations. Suture strongly impressed, except on the last turn, which is appressed to the preceding whorl. Periphery well rounded. Base strongly rounded, openly umbilicated, with a strongly elevated keel marking the outer edge of the umbilicus. This keel is decidedly notched and roughened, and separated from the umbilical wall by a strong groove. On the outside it is also separated by a groove, but here the groove is weaker than that on the umbilical side. The rest of the base is marked by obsolete spiral lines and indications of malleations, as well as strong incremental lines. The umbilical wall is marked by numerous incremental lines, which tend toward the formation of riblets. Aperture circular, protracted into an angle at the posterior angle; outer lip of the peristome thin; inner, somewhat thickened. Operculum typically ptychocochlid.

The specimen figured, U.S.N.M. No. 356092, was collected by John B. Henderson at Holly Mount, St. Catherine Parish, Jamaica. It has 5 whorls and measures: Height, 19.4 mm.; greater diameter, 28.6 mm.; lesser diameter, 21.0 mm.

The species has a rather wide distribution through the northern part of the island. It ranges through Trelawny and St. Ann Parishes and the northeastern part of St. Catherine Parish.

PTYCHOCOCHLIS HENDERSONI, new species

PLATE 15, FIGURES 7–9

Shell of medium size, depressed-helicoid. The denuded specimen white. The nucleus consists of a single well-rounded, smooth turn. The postnuclear whorls are inflated and strongly rounded; the first is marked by slender, feeble axial riblets; the succeeding turns in addition to the axial riblets are marked by protractively curved ridges, which are about as wide as the spaces that separate them and which do not extend on the anterior fourth of the turns. These ridges extend fairly strongly to the very end of the last whorl. Suture strongly impressed on all but the last turn, which is appressed to the preceding whorl. Periphery well rounded. Base broadly openly umbilicated. The outer edge of the umbilicus is bounded by a weak keel. The base is marked by rather strong incremental lines and a series of oblique pits, which are not profound at the outer edge of the umbilical keel. The umbilical wall is marked by low, rather broad axial riblets and incremental lines. Aperture circular, oblique, protracted into an angle at the posterior angle; peristome slightly thickened. Operculum typically ptychocochlid.

The type, U.S.N.M. No. 535969, was collected between Fort Augusta and Port Henderson in St. Catherine Parish, Jamaica. It has 4.4 whorls and measures: Height, 11.3 mm.; greater diameter, 17.1 mm.; lesser diameter, 13.2 mm.

Two additional specimens from the same locality are a trifle larger.

This species is nearest related to *P. marianna*, from which it can readily be separated by its broader umbilicus.

PTYCHOCOCHLIS MARIANNA, new species

Plate 15, Figures 1–3

Shell of medium size, helicoid, chestnut-brown, a trifle paler on the underside. The nucleus consists of a single well-rounded, smooth turn. Postnuclear whorls inflated, strongly rounded; the first is marked by slender, retractively slanting, hairlike axial riblets, which are as wide as the spaces that separate them. On the succeeding turns these riblets become decidedly intensified and irregular as they cross the ridges, nodulations, and pits. Beginning with the second postnuclear whorl, oblique protractively slanting wrinkles make their appearance. These ridges are separated by spaces not quite so wide as the wrinkles. This sculpture continues to the last half of the last turn, beyond which the wrinkles become irregularly disposed and also decidedly irregular in size. Toward the end of this whorl they become almost obsolete. Suture strongly impressed on the early whorls, adnate on the last whorl. Periphery well rounded. Base well-rounded, narrowly umblicated, the umbilicus provided with a strong keel at its outer limit. A deeply impressed groove separates the keel from the umbilical wall. The keel is rendered decidedly rough by the incremental elements. The base is marked by scarcely perceptible indications of nodules. It also gives one the impression of having obsolete spiral threads. The umbilical wall is marked by moderately strong incremental lines. Aperture circular, decidedly oblique, protracted into an angle at the posterior angle; peristome thin. Operculum typically ptychocochlid.

The type, U.S.N.M. No. 535970, was collected by Henderson at Roaring River Falls, Ocho Rios, St. Ann Parish, Jamaica. It has 5 whorls and measures: Height, 17.0 mm.; greater diameter, 21.2 mm.; lesser diameter, 16.3 mm.

The species appears to be confined to the north coast of St. Ann and St. Mary Parishes.

PTYCHOCOCHLIS LACTEOFLUVIALIS (Pilsbry and Brown)

Plate 15, Figures 4–6

1910. *Aperostoma* (*Ptychocochlis*) *lacteofluviale* Pilsbry and Brown, Proc. Acad. Nat. Sci. Philadelphia, 1910, p. 534.

Shell rather small, helicoid, covered with a chestnut-brown periostracum. The nucleus consists of a single well-rounded, smooth turn. Postnuclear whorls inflated, strongly rounded; the first marked with mere protractively slanting incremental lines; the rest also show incremental lines, which gradually increase in size, and form on the last turn more or less sinuous, almost hairlike riblets. Beginning with the second postnuclear whorl, weak, protractively slanting axial wrinkles make their appearance, which do not extend to the posterior third of the whorls and are best emphasized on the middle. These wrinkles are about as wide as the spaces that separate them. The wrinkles disappear on the last whorl, where indications of spiral obsolete threads make their appearance. Suture very strongly impressed on all but the last half of the last whorl, which is adnate. Periphery well rounded. Base inflated, strongly rounded, openly umbilicated, with a weakly developed cord marking the outer limit of the umbilicus. The base has scarcely any indications of obsolete nodules, but is marked by feeble spiral cords and incremental lines. The umbilical wall is marked by rather coarse riblets and incremental lines. Aperture decidedly oblique, strongly protracted to form an angle at the posterior angle. Operculum typically ptychocochlid.

The specimen figured, U.S.N.M. No. 356037, is one of a series of specimens collected by C. B. Taylor at Round Hill, Milk River, Clarendon Parish, Jamaica. It has 4.7 whorls and measures: Height, 12.5 mm.; greater diameter, 16.5 mm.; lesser diameter, 13.0 mm.

The species seems to be confined to the Milk River region of southwestern Clarendon Parish.

PTYCHOCOCHLIS SAVANNENSIS, new species

Plate 15, Figures 13–15

Shell of medium size, depressed-helicoid, covered with a pale chestnut-brown periostracum. The nucleus consists of a single well-rounded, smooth whorl. The postnuclear whorls are inflated and strongly rounded; the first is marked by slender, closely spaced, hairlike, retractively slanting axial riblets. The second postnuclear whorl, in addition to slender riblike incremental lines, is marked by almost vertical axial ridges, which are separated by spaces about twice as wide as the ridges. Beginning with the third postnuclear whorl, the ridges assume a protractively slanting position. Here they do not reach to the summit but terminate at the anterior third between summit and suture. These ridges here are not quite so wide as the spaces that separate them. On the last whorl they again disappear and the whorl is marked by irregular nodules, which become decidedly enfeebled on the last portion of this turn. Suture strongly impressed on all but the last turn, which is adnate to the preceding whorl. Periphery well rounded. Base strongly rounded, openly, rather narrowly umbilicated and provided with a rather strong keel at the outer limit of the umbilicus. The base is marked by lines of growth and scarcely any indications of nodulations. The umbilical wall is marked by rather rough lines of growth. Aperture circular, protracted into an angle at the posterior angle. Operculum typically ptychocochlid.

The type, U.S.N.M. No. 356025, is one of a large series of specimens collected by Henderson at Savanna la Mar, Westmoreland Parish, Jamaica. It has 4.5 whorls and measures: Height, 13.0 mm.; greater diameter, 20.2 mm.; lesser diameter, 14.5 mm.

This species is confined to the region about Savanna la Mar, that is, the southern side of central Westmoreland Parish.

PTYCHOCOCHLIS ORCUTTI, new species

PLATE 15, FIGURES 27–29

Shell large, helicoid, covered with a chestnut-brown periostracum, sometimes with a light zone near the summit and the periphery. When the periostracum is removed there is a pinkish tinge to the shell substance of the last whorl. The nucleus consists of 1.5 well-rounded, smooth whorls. The postnuclear whorls are inflated and strongly rounded; the first is marked by feeble, slightly retractively slanting, hairlike riblets, which are not so wide as the spaces that separate them. Beginning with the second postnuclear whorls, weak, oblique, low, protractively slanting ridges make their appearance, which do not reach the anterior fourth between summit and suture. These disappear shortly after the last whorl is reached, where they are replaced by feeble, irregular nodules, which become obsolete on the last part of the last turn. Suture moderately strongly impressed on the early whorls; the last has the summit appressed, which characteristic renders the sutrure less conspicuous. Periphery well rounded. Base somewhat inflated, well rounded, openly, moderately broadly umbilicated. The umbilicus is bounded on the outside by a cord, which is rendered rough by the incremental lines.

The base is marked by incremental lines and appears free from nodulations. The umbilical wall is marked by coarse, irregular riblets and lines of growth. Aperture circular, decidedly oblique, with a strongly protracted angle at the posterior angle; outer lip thin; the inner, thickened. Operculum typically ptychocochlid.

The type, U.S.N.M. No. 395588, was collected by Orcutt at Arntully Estate on Stony Valley River, at an elevation of 3,000 feet in St. Thomas Parish, Jamaica. It has 5.1 whorls and measures: Height, 20.1 mm.; greater diameter, 26.8 mm.; lesser diameter, 20.0 mm.

The species appears to range through the southern slope of the Blue Mountains in St. Thomas Parish.

PTYCHOCOCHLIS MINOR (Chitty)

Plate 15, Figures 10–12

1857. *Cyclotus corrugatior minor* Chitty, Proc. Zool. Soc. London, vol, 25, p. 150.

Shell of medium size, depressed-helicoid, covered with a pale brown periostracum. The nucleus consists of a little more than a smooth rounded whorl. The postnuclear whorls are inflated and well rounded; the first is marked by slender, very poorly developed axial riblets. Beginning with the second, these axial riblets form wrinkles, which do not extend to the summit of the whorls but are decidedly obliquely protractively slanting on the posterior half of the whorl, and then bend at an equal angle, retractively, toward the suture, that is, forming an arrow-shaped angle, producing a cone-in-cone effect. The spaces that separate these wrinkles are not quite so wide as the wrinkles. This sculpture disappears on the last whorl, where irregularly developed and distributed nodules replace it. Suture well impressed on the early whorls; on the last whorl the summit is appressed and the suture becomes less conspicuous. Periphery well-rounded. Base well rounded, rather narrowly umbilicated, with a strong keel marking the outer edge of the umbilicus, which is decidedly pinched in at its inner margin. The outside of the umbilical keel is rendered notched by the irregularly developed incremental lines. The rest of the base is marked by obsolete spiral threads. The umbilical wall bears rather coarse, closely spaced riblets. Aperture subcircular, oblique, decidedly protracted into an angle at the posterior angle; outer lip thin, inner lip somewhat thickened. Operculum typically ptychocochlid.

The specimen figured, U.S.N.M. No. 128016, comes from Mandeville, Manchester Parish, Jamaica. It has 4.5 whorls and measures: Height, 12.5 mm.; greater diameter, 17.8 mm.; lesser diameter, 13.3 mm.

This species appears to range through southwestern Manchester Parish and southeastern St. Elizabeth Parish.

PTYCHOCOCHLIS MAGNA (Chitty)

Plate 15, Figures 30–32

1857. *Cyclotus corrugatior magna* Chitty, Proc. Zool. Soc. London, vol. 25, p. 150.
1912. *Neocyclotus (Plectocyclotus) varians knobbei* Kobelt, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, pt. 3, p. 944, pl. 141, figs. 13–14.

Shell rather large, helicoid, pale brown with a rosy flush; interior of the aperture pale brown. The nucleus consists of a single well-rounded, smooth turn. The postnuclear whorls are decidedly inflated, strongly rounded; the first is marked by slender, hairlike, slightly retractively curved axial riblets. From there on oblique, retractively slanting ridges make their appearance. These ridges extend from near the summit to about the middle of the whorl; they then suddenly change to a decidedly oblique protracted slant, thus producing a series of more or less regular cone-in-cone shaped areas. On the last whorl this sculpture is replaced by rather irregular wrinkling on its first half, while the last half lacks nodulations. Suture strongly impressed except on the last whorl, which is appressed to the preceding turn. Periphery strongly rounded. Base narrowly umbilicated, with a strong keel marking the outer limit of the umbilicus. The base, as well as the last part of the upper surface, shows weak spiral threads. The umbilical wall is marked by rather coarse riblets and incremental lines. Aperture circular, angulated at the posterior angle; outer lip thin, the inner lip thicker. Operculum typically ptychocochlid.

The specimen figured, U.S.N.M. No. 535971, is one of three in our collection labeled "Jamaica," without specific locality. It has 5 whorls and measures: Height, 21.0 mm.; greater diameter, 23.9 mm.; lesser diameter, 18.4 mm.

P. magna is easily distinguished from the other members of the genus by its extremely elevated outline.

PTYCHOCOCHLIS MONTEGOENSIS, new species

Plate 15, Figures 33–35

Shell moderately large, depressed-helicoid, chestnut-brown. Early whorls with a rosy flush. The nucleus consists of a little more than a single whorl, which is well rounded and smooth. The postnuclear whorls are inflated, well rounded; the first half of the first postnuclear whorl is marked by slender, slightly retractively curved axial riblets; the second half shows the beginning of decidedly protractively curved wrinkles, which do not quite extend to the summit, and which are about as wide as the spaces that separate them. On the penultimate whorl these wrinkles take a retractive slant on the posterior portion of the whorl, then bend strongly into a protractive position, thus forming arrow-points that give to the sculpture of this whorl a cone-in-cone shaped effect. On the last whorl the sculpture becomes irregular and on the last half of the last turn quite obsolete. Suture strongly impressed on the early turns; on the last whorl the summit of the turn is appressed to the preceding turn and the suture is less conspicuous. Periphery strongly rounded. Base moderately broadly umbilicated, with a strong keel marking the outer limit of the umbilicus. This keel is strongly inpinched on the umbilical margin and less so on the basal margin. It is rendered rough by the incremental lines. The base does not have pronounced tubercles but merely here and there an indication thereof. The umbilical wall is marked with moderately strong riblets and incremental lines. Aperture circular, the posterior angle protracted into an angulation; outer lip of the peristome thin, the inner slightly thickened. Operculum typically ptychocochlid.

The type, U.S.N.M. No. 535972, was collected by Henderson at Montego Bay, St. James Parish, Jamaica. It has 4.7 whorls and measures: Height, 15.7 mm.; greater diameter, 21.6 mm.; lesser diameter, 16.2 mm.

The species seems to be confined to the region about Montego Bay, where it appears to be rather abundant.

PTYCHOCOCHLIS VENDREYSI, new species

PLATE 15, FIGURES 36–38

Shell rather large, dark chestnut-brown, with a little paler zone at the suture and a rosy tinge on the early whorls. The interior of the shell is bright chestnut-brown with a reddish tinge, the edge of the peristome being a little paler. The nucleus consists of a little more than a single turn, which is well rounded and smooth. The postnuclear whorls are inflated and well rounded; the first turn is marked by slender, retractively curved axial riblets; the next, in addition to the axial riblets, which become almost lamellose on the succeeding turns, is marked by decidedly protractively curved, low, weakly developed ridges which are separated by equally inconspicuous impressions. On the remaining turns this sculpture becomes obsolete and the surface is merely rendered slightly rough by a few pits and weak nodules. The last portion of the upper surface of the last whorl bears indications of poorly developed spiral threads. Suture of the early whorls well impressed; the last whorl has the summit appressed and the suture thereof not so strongly emphasized. Periphery well rounded. Base well rounded, openly umbilicated, with a strong keel at the outer edge of the umbilicus, which is strongly inpinched on its umbilical margin and feebly impressed on the outer edge. The base, in addition to incremental lines, has some indications of spiral threads and an occasional little nodule. The umbilical wall is marked with axial riblets and incremental lines. Aperture circular, decidedly oblique, with the posterior angle produced into a decided angulation. Outer lip of the peristome thin, the inner lip somewhat thickened. Operculum typically ptychocochlid.

The type, U.S.N.M. No 535973, is one collected by Orcutt at Worthy Park, 1 mile from Luidas Vale, St. Catherine Parish, Jamaica. It has 4.9 whorls and measures: Height, 18.9 mm.; greater diameter, 25.7 mm.; lesser diameter, 19.1 mm.

The species appears to be confined to St. Catherine Parish, where it is rather widely distributed.

PTYCHOCOCHLIS SUBGLOBOSA, new species

PLATE 15, FIGURES 16–18

Shell of medium size, helicoid, covered with a dark chestnut-brown periostracum. There is an indication of a lighter zone at the appressed summit of the last whorl. The nucleus consists of 1.2 well-rounded, smooth whorls. The postnuclear whorls are inflated and strongly rounded; the first is marked with fine, retractively slanting, closely spaced, hairlike riblets, which become somewhat strengthened on the succeeding turns and appear as low lamellae on the last whorl. Beginning with the second postnuclear whorl, the upper side of the turns is marked with irregularly developed and disposed weak low nodulations, which lend to the surface a somewhat rough and malleated aspect. Suture strongly impressed except on the last whorl, the summit of which is appressed to the preceding turn, which causes the suture to be less pronounced. Periphery well rounded. Base inflated, well rounded, openly umbilicated with a strong broad rounded keel at the outer edge of the umbilicus. This keel is decidedly notched and has a number of not very deep, somewhat protractively, obliquely directed indentations outside of it. The rest of the base is slightly malleated and shows low obsolete spiral threads. The umbilical wall is marked by strong lines of growth. Aperture circular, protracted at the posterior angle into an angulation. Operculum typically ptychocochlid.

The type, U.S.N.M. No. 398910, is one of a series of specimens collected by Orcutt on the east side of Ferry River above Kingston on the Spanish Town road, St. Andrew Parish, Jamaica. It has 5 whorls and measures: Height, 15.7 mm.; greater diameter, 19.8 mm.; lesser diameter, 14.3 mm.

The species ranges through St. Catherine and St. Ann Parishes.

PTYCHOCOCHLIS CAMPEACHYI (H. B. Baker)

Shell small, helicoid, covered with a chestnut-brown periostracum; interior of the aperture pale brown. The nucleus consists of about 1.2 well-rounded, smooth whorls. The postnuclear whorls are inflated and strongly rounded. In one of the subspecies, *P. c. petricola*, the first nuclear whorl is marked by very coarse, distantly spaced axial ribs. In the typical race the axial riblets are fine and less strongly developed. The succeeding whorls are slightly malleated, almost smooth, and marked with lines of growth. Suture strongly impressed except on the last turn, which is appressed to the summit. Periphery well rounded. Base narrowly umbilicated with a limiting keel at the outer edge of the umbilicus. The rest of the base is marked like the upper surface of the last whorl, that is, it shows the lines of growth and obsolete malleations and indications of spiral threads. The umbilical wall is marked by incremental lines. Aperture subcircular, decidedly oblique, decidedly protracted into an angle at the posterior angle; outer lip of the peristome thin, the inner somewhat thickened. Operculum typically ptychocochlid.

I am recognizing two subspecies:

KEY TO THE SUBSPECIES OF PTYCHOCOCHLIS CAMPEACHYI

Early postnuclear whorls strongly axially ribbed	**petricola**
Early postnuclear whorls feebly axially ribbed	**campeachyi**

PTYCHOCOCHLIS CAMPEACHYI PETRICOLA, new subspecies

PLATE 15, FIGURES 22–24

This subspecies appears confined to the southern part of St. Andrew Parish, Jamaica. It is differentiated from *P. c. campeachyi* (H. B. Baker) by having the first postnuclear whorl provided with strong axial ribs. It is also larger than that subspecies.

The type, U.S.N.M. No. 535947, comes from Stony Hill, St. Andrew Parish, Jamaica. It has 4.5 whorls and measures: Height, 12.8 mm.; greater diameter, 16.6 mm.; lesser diameter, 12.8 mm.

PTYCHOCOCHLIS CAMPEACHYI CAMPEACHYI (H. B. Baker)

PLATE 15, FIGURES 19–21

1934. *Poteria varians campeachyi* H. B. BAKER, Nautilus, vol. 48, pp. 61–62, figs. 5, 19, 22.

This is the smaller of the two subspecies, which ranges through the central portion of St. Catherine Parish. It is distinguished from *P. c. petricola* by its smaller size and weak axial ribs on the first postnuclear turn.

The type, Acad. Nat. Sci. Philadelphia No. 139611, was collected by Dr. H. B. Baker near Campeachy Gully Marsh on the northwest side of Port Henderson Hill, St. Catherine Parish, Jamaica. It has 4.8 whorls and measures: Height, 12.2 mm.; greater diameter, 15.2 mm.; lesser diameter, 11.3 mm.

PTYCHOCOCHLIS SUBRUGOSA (Sowerby)

PLATE 15, FIGURES 25, 26

1850. *Cyclostoma subrugosum* SOWERBY, Thes. conchyliorum, vol. 1, Supplement. p. 161*, pl. 31B, figs. 308–309.

1852. *Cyclotus subrugosus* PFEIFFER, Monographia pneumonopomorum viventium, vol. 1, p. 28.

1898. *Neocyclotus* (*Plectocyclotus*) *subrugosus* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 139, reprint.

Since I have not seen this species, I quote Sowerby's description and reproduce his figures:

"Shell suborbicular, depressed, slightly corrugated, white; spire depressed, obtuse, slightly prominent at the apex; volutions four, rounded, slightly depressed posteriorly; suture distinct, marked with a nearly obsolete line in front; aperture nearly circular; peritreme slightly thickened posteriorly, thin on the side of the umbilicus, separated from the last volution; umbilicus large, anteriorly keeled.

"This species is related to *C. corrugatum.*

"Jamaica."

Genus POTERIA Gray

In 1850 Gray, in his "Nomenclature of Molluscus Animals and Shells in the Collection of the British Museum," part 1, Cyclophoridae, page 11, defines the name *Poteria*, which he had used in his "Synopsis of the Contents of the British Museum," in 1840 and 1842, as a nude name, by stating, "whorls in front of the axis keeled. Peristome straight." Here he cites two species without designating a type:

> 27. CYCLOTUS LINEATUS [Gray].
> Cyclostoma jamaicense *Sow. Thes. Conch.* i. 96. n. 15. t. 23. f. 12, 13., not Gray.
> Aper. jamaicense *Pfeiff.* 1. c. 104. n. 3.
>
> * * * * * * *
>
> 28. CYCLOTUS JAMAICENSIS [Gray].
> Cyclost. corrugatum *Menke, Cat. Malak.* 10.; *Sow. Proc. Zool. Soc.* 1843, 30., *Thes. Conch.* i. 95. t. 23, f. 10, 11.; *Pfeiffer, Kuster, Chemn. Conch. Cab.* 17. n. 8 i. 19. t. 2, f. 13, 14.
> Turbo jamaicensis *Chemn. Conch.* xi. t. 209. f. 2057, 2058.
> T. (Cyclostoma) jamaicensis *Gray* in *Wood's cat. Supp.* t. 6. f. 3.; *Lister, Conch.* t. 55. f. 51.; *Sloane, Jamaica,* ii. t. 240. f. 84.
> Aper. corrugatum *Pfeiff.* 1. c. 104. n. 4.

In other words, he lumps here about everything known from Jamaica at that time except what had been segregated to form his *Cyclotus lineatus.*

Baker, in 1922, Nautilus, vol. 35, pages 14, 15, resurrected the forgotten name *Poteria* and designated *Turbo jamaicensis* (Chemnitz) Wood, 1828, as type. This, unfortunately, still leaves some doubt about the actual type restriction for the genus, since *Turbo jamaicensis* Chemnitz (nonbinominal), rechristened orthodoxly *Cyclostoma corrugatum* in 1830 by Menke, is quite distinct from *Turbo* (*Cyclostoma*) *jamaicensis* Gray.

Therefore, I now further restrict the type designation by selecting *Turbo jamaicensis* Gray (*in* Wood, Index testaceologicus, Suppl., p. 18, pl. 6, fig. 3, 1828=*Cyclostoma jamaicense*, *ibid.*, p. 36, same plate and figure) as type. The synonymy is as follows:

1850. *Poteria* Gray, Nomenclature of molluscous animals and shells in the collection of the British Museum, pt. 1, Cyclophoridae, p. 11. (Type: *Cyclostoma jamaicense* Gray, *in* Wood.)

1898. *Plectocyclotus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 28, p. 139 (reprint; not in original). Type by subsequent designation (Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, p. 533): *Cyclostoma jamaicense* Sowerby=*Poteria* (*Poteria*) *lineata* (Gray).

The group is characterized by the possession of a rather heavy medium-sized shell, which has an umbilical bounding keel that varies in different species from very strong to obsolete. The shell may be strongly malleated or less so, or malleations may be absent. The operculum bears a strongly elevated spiral lamella, which is almost at right angles to the chondroid basal plate, and curves outward. The genus is confined to Jamaica.

I am recognizing two subgenera, which the following key will help to differentiate:

KEY TO THE SUBGENERA OF POTERIA

Space between the opercular lamella with retractively curved raised threads	**Poteria**
Space between the opercular lamella without retractively curved raised threads	**Cyclobakeria**

Subgenus Poteria Gray

For synonymy see above.

Poterias in which the broad spaces separating the turns of the lamella are reenforced with retractively curved raised threads.

Type: *Turbo* (*Cyclostoma*) *jamaicensis* Gray=*Poteria* (*Poteria*) *jamaicensis* (Gray).

The radula of *Poteria* (*Poteria*) *lineata* (Gray) has the following formula 3:3:3:3, and the jaw lacks distinct median projections. The verge is situated on the back of the neck behind the tentacles. It is swollen basally and provided with a seminal groove and a very short simple appendage.

KEY TO THE SPECIES OF SUBGENUS POTERIA

- Upper surface of last whorl corrugated.
  - Shell helicoid.
    - Penultimate whorl with wrinkles.
      - Wrinkles and pits coarse ---------- burringtoni
      - Wrinkles and pits not coarse ---------- imitator
    - Penultimate whorl with axial riblets only ---------- lineata
  - Shell depressed-helicoid.
    - Umbilical keel strong ---------- corrugatissima
    - Umbilical keel obsolete ---------- pallescens
- Upper surface of last whorl not corrugated.
  - Axial riblets almost lamellar ---------- jamaicensis
  - Axial riblets not almost lamellar.
    - Whorls flattened near summit ---------- plana
    - Whorls not flattened near summit ---------- crassa

This key does not include Chitty's *Cyclotus nodosus*, *notatus*, and *inutilis*, specimens of which I have not seen. I have copied Chitty's descriptions and offer suggestions as to their relationship under each of these species.

POTERIA (POTERIA) BURRINGTONI, new species

Plate 16, Figures 31–33

Shell rather large, helicoid, covered with a chestnut-brown periostracum. The nucleus consists of 1.5 inflated, well-rounded, smooth turns. The postnuclear whorls are inflated and strongly rounded; the first is marked by rather strong axial riblets, which are not quite so wide as the spaces that separate them. On the succeeding turns these axial riblets become somewhat weakened, irregular in strength and disposition. In comparison they are here narrower and more elevated. Beginning with the third whorl, strong axial wrinkles make their appearance. They are at first rather irregular, but on the first half of the last whorl they assume a decidedly obliquely slanting retractive form. These wrinkles render the upper surface decidedly rough. Suture well impressed, except that of the last turn, where the summit of the whorls is appressed to the preceding turn. Periphery well rounded and marked by the continuation of the oblique wrinkles described for the spire. These wrinkles also extend over the low rounded base to the umbilical keel. They become weakened toward the aperture. Base openly umbilicated, with a rounded keel marking the outer limit of the umbilicus. The umbilical wall bears rather strong axial ribs, which are crossed by incremental lines. These ribs look as if they might be the continuation of the oblique wrinkles. Aperture subcircular, oblique, decidedly protracted into an angle at the posterior angle; peristome somewhat sinuous; that of the outer lip thin, while that of the inner lip is somewhat thickened. Operculum typically poterid.

The type of this species, the only specimen known, was collected by Dr. H. B. Baker at Somerset, Manchester Parish, Jamaica, and bears the Philadelphia Academy of Natural Sciences catalog number 174145. It has 5.2 whorls and measures: Height, 17.8 mm.; greater diameter, 27.0 mm.; lesser diameter, 20.0 mm.

This is by far the most roughly corrugated species of the Jamaican Poterias, having the largest and most distantly spaced wrinkles of all.

POTERIA (POTERIA) IMITATOR, new species

Plate 16, Figures 10–12

Shell of medium size, unicolor or more frequently banded with a broad zone of dark chestnut brown above and below the periphery, the posterior half, the band at the periphery, and the base being brownish yellow. The nucleus consists of a single whorl, which is very small, almost flattened, and moderately well rounded. The first postnuclear turn is marked by fine, decidedly retractively curved axial riblets, which are about as wide as the spaces that separate them. These riblets on the next turn become much increased in size. They are low, well rounded, and almost as wide as the spaces that separate them. On the succeeding turn the axial riblets are lost sight of by their conspicuous wrinkling and pitting. The wrinkles here branch and anastomose and form an irregular network of meshes enclosing well-impressed pits, which may be circular or elongate. The summit of the turns is decidely nodulose on the last whorl. On the early postnuclear whorls the suture is well impressed. Periphery well rounded and marked by the pitting described for the spire. Base well rounded, broadly openly umbilicated with a decidedly elevated, almost lamellar keel marking the outer edge of the umbilicus. This keel is rendered rough by the incremental lines. The anterior third of the base between the periphery and the umbilical keel, that is the portion usually covered by a brown band, is smooth; the rest of the base is wrinkled like the spire, but here the wrinkles are finer and the pits enclosed between them a little deeper. The umbilical wall bears regular axial riblets and fine lines of growth. Aperture subcircular, somewhat oblique, decidedly protracted into an angle at the posterior angle and thickened at the umbilical keel; the outer lip of the peristome is thin, and the inner somewhat thickened. The operculum is typically poterid.

The type, U.S.N.M. No. 535975, was collected by C. R. Orcutt at Bogue Hill, St. Elizabeth Parish, Jamaica. It has 4.8 whorls and measures: Height, 16.9 mm.; greater diameter, 23.6 mm.; lesser diameter, 17.8 mm.

This species occupies the northern part of St. Elizabeth Parish and the adjacent areas of Manchester Parish.

At first glance one might consider this to be *Aperostoma* (*Cycladamsia*) *seminudum* (C. B. Adams), as far as the general shape and color scheme are concerned, but it can at once be distinguished by its poterid operculum.

POTERIA (POTERIA) LINEATA (Gray)

Shell varying from helicoid to decidedly elevated helicoid in outline, unicolor or banded; periostracum ranging from brownish buff to chestnut colored. The nucleus consists of 1.5 decidedly elevated, inflated, strongly rounded, smooth whorls. The first 2 postnuclear whorls are marked by slender, very regular, retractively curved axial riblets; beyond this the axial riblets become less regular and on the last whorl are mere elevated incremental lines. On the last whorl wrinkles make their appearance on the upper surface; they are of irregular size and irregularly disposed. Here, too, spiral threads are present. The suture of the early whorls is well impressed; on the last two the summit of the whorls is appressed to the preceding turn, and the suture becomes less conspicuous. Periphery well rounded. Base well rounded, openly umbilicated, with a strong keel marking the outer edge of the umbilicus. The base, also, is marked by irregular wrinkles, but here they assume a more spiral arrangement. The deepest pits are next to the umbilical keel. The umbilical wall is marked by low rounded axial ribs, which, as well as their interspaces, are crossed by incremental lines. Aperture subcircular, oblique, decidedly protracted into an angulation at the posterior angle; the outer lip of the peristome is thin, the inner, thickened, particularly so at the umbilical keel. Operculum typically poterid.

I am recognizing two subspecies, which the following key and descriptions will help to differentiate:

KEY TO THE SUBSPECIES OF POTERIA (POTERIA) LINEATA

Height more than 20 mm-- lineata
Height less than 17 mm-- cycloata

POTERIA (POTERIA) LINEATA LINEATA (Gray)

PLATE 16, FIGURES 34–36; PLATE 42, FIGURES 14, 15

1843. *Cyclostoma jamaicense* SOWERBY, Thesaurus conchyliorum, vol. 1, p. 96, No. 15, pl. 23, fig. 12 (not *Cyclostoma jamaicense* Gray, 1828).

1850. *Cyclotus* (*Poteria*) *lineatus* GRAY, Nomenclature of the molluscous animals and shells in the collection of the British Museum, pt. 1, Cyclophoridae, p. 11.

This subspecies appears to be the most abundant race in Jamaica. It is rather widely distributed. We have specimens from Westmoreland, St. James, St. Elizabeth, Manchester, St. Ann, and Clarendon

Parishes. Its larger size and more elevated form will readily distinguish it from its more western relative.

The specimen figured, U.S.N.M. No. 375939, was collected by Orcutt at Carisbrook, St. Elizabeth Parish. It has 5.5 whorls and measures: Height, 21.0 mm.; greater diameter, 26.6 mm.; lesser diameter, 20.3 mm.

POTERIA (POTERIA) LINEATA CYCLOATA (Chitty)

Plate 16, Figures 7–9

1857. *Cyclotus cycloatus* Chitty, Proc. Zool. Soc. London, vol. 25, p. 148.
1898. *Neocyclotus* (*Plectocyclotus*) *cycloatus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

This subspecies appears to be confined to the southwestern part of Westmoreland Parish. It is distinguished from the typical *P.* (*P.*) *l. lineata* (Gray) in being smaller and less elevated, with a weaker umbilical keel, and in having the last whorl usually not so strongly appressed to the preceding turn.

The specimen figured, U.S.N.M. No. 356017, is one of a large series collected by Henderson at Mount Pleasant, Westmoreland Parish, Jamaica. It has 5.2 whorls and measures: Height, 16.0 mm.; greater diameter, 23.1 mm.; lesser diameter, 17.3 mm.

POTERIA (POTERIA) CORRUGATISSIMA (Chitty)

Plate 16, Figures 37–39

1857. *Cyclotus corrugatissimus* Chitty, Proc. Zool. Soc. London, vol. 25, p. 155.
1898. *Neocyclotus* (*Plectocyclotus*) *corrugatissimus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

Shell large, very depressed-helicoid, covered by a chestnut-brown periostracum. The nucleus consists of a little more than one moderately rounded smooth whorl. The postnuclear whorls are strongly rounded, slightly flattened toward the summit. The first 2.5 are marked by strong, retractively curved axial riblets, which are separated by spaces about 1.5 times as wide as the riblets. Beyond this wrinkles make their appearance. These consist of two series: Strong wrinkles, which extend from the summit toward the periphery, being strongest at the summit and fading ventrally, having a protractive slant; these are crossed by even more oblique, less strong wrinkles, which are decidedly retractively slanting, the combination forming a peculiar pattern. Suture strongly impressed on the early whorls, less conspicuous on the last, where the summit of the whorl is strongly appressed to the preceding turn. Periphery marked by the combination of the sculpture described for the spire. Base moderately rounded, very widely openly umbilicated, with a strong keel marking the outer edge of the umbilicus. This keel on the first half of the last whorl consists of oblique, protractive strong short ridges, which on the last half disappear and give place to rough corrugations. Bordering the basal keel, on the outside, is a series of deep pits. The rest of the base is marked by more or less continuous wrinkles, which have a slightly oblique trend, being almost spiral in disposition. The umbilical wall is covered by strong axial ribs and fine incremental lines. Aperture subcircular, decidedly oblique, with a conspicuous protracted angle at the posterior angle; outer lip of the peristome thin, the inner thickened, particularly so at the basal keel. Operculum typically poterid.

The specimen figured, U.S.N.M. No. 397856, was collected by Orcutt 5 miles from Black River on the road to Newmarket, St. Elizabeth Parish, Jamaica. It has 5.25 whorls and measures: Height, 16.6 mm.; greater diameter, 26 mm.; lesser diameter, 19.4 mm.

The species appears to be restricted to southwestern St. Elizabeth Parish, although we have it also from one station in Westmoreland Parish, just across the border. In shape and in the sculpture of the upper surface *P.* (*P.*) *corrugatissima* resembles most nearly *P.* (*P.*) *pallescens* (C. B. Adams), from which it can readily be distinguished by its much stronger basal keel and much stronger basal sculpture.

POTERIA (POTERIA) PALLESCENS (C. B. Adams)

Plate 16, Figures 28–30

1851. *Cyclostoma pallescens* C. B. Adams, Ann. Lyc. Nat. Hist. New York, vol. 5, p. 59.

1852. *Cyclotus pallescens* Pfeiffer, Monographia pneumonopomorum viventium, vol. 1, p. 27.

1898. *Neocyclotus* (*Plectocyclotus*) *pallescens* Kobelt and Möllendorff, Nachrb. deutschen Malak. Ges., vol. 29, p. 138, reprint.

Shell large, decidedly depressed-helicoid, almost planorboid, covered with a dark chestnut-brown periostracum. The nucleus consists of about 1.5 moderately elevated, well-rounded, smooth turns. The first postnuclear whorl is marked by weak, rather elevated axial riblets, which are about as wide as the spaces that separate them. On the succeeding turn these axial riblets become less regular, and wrinkles make their appearance on the upper surface. On the first part of the last turn these wrinkles have both a decidedly oblique protractive and retractive arrangement. On the last half of the last whorl they are more inclined toward a protractive arrangement. These wrinkles do not quite extend to the summit of the whorls but begin at the anterior termination of the anterior fourth between the summit and suture, the summit being marked by rough lines of growth only. Suture strongly impressed, even on the last whorl.

Periphery well rounded. Base very broadly openly umbilicated, with a very weak cord marking the outer limit of the umbilicus. The sculpture of the base between the periphery and this cord consists of obsolete wrinkles, which tend toward spiral disposition. The umbilical area is marked by coarse ribs and fine incremental lines. Aperture subcircular, somewhat effused at the junction of the outer and basal lip, protracted into an angle at the posterior angle; outer lip thin, the inner somewhat thickened. Operculum typically poterid.

The specimen figured, U.S.N.M. No. 356125, was received from C. B. Adams, bearing the label "Jamaica" without definite locality. It has 4.9 whorls and measures: Height, 16.7 m..; greater diameter, 27.2 mm.; lesser diameter, 19.8 mm.

The species seems to be confined to northeastern St. Elizabeth Parish, Jamaica. In general shape it recalls *P.* (*P.*) *corrugatissima* (Chitty), but the coarseness of the wrinkles on the upper surface and their arrangement in a protractive and retractive series will at once distinguish it. It can also be differentiated from *corrugatissima* by the absence of the strong umbilical keel and in having the basal sculpture also much less strongly developed.

POTERIA (POTERIA) JAMAICENSIS (Gray)

PLATE 16, FIGURES 4–6

1828. *Cyclostoma jamaicense* GRAY, in Wood, Index testaceologicus, ed. 2, Suppl., p. 36, pl. 6, fig. 3 (not *Turbo jamaicensis* Chemnitz, 1795, nonbinominal; or *Cyclostoma jamaicense* Sowerby, 1843).

1857. *Cyclotus novussaltus* CHITTY, Proc. Zool. Soc. London, vol. 25, p. 154.

Shell moderately large, helicoid, covered with an elevated brownish periostracum, which is rendered spotted by wearing of the axial riblets. The nucleus consists of a little more than a single well-rounded, moderately elevated turn. The postnuclear whorls are marked by a strong retractively curved axial riblets, which assume the strength of low, appressed, retractively slanting lamellae on the last turn. Suture well impressed on all but the last whorl, which is appressed to the preceding turn. Periphery well rounded, crossed by the axial ribs. Base somewhat inflated, well rounded, openly umbilicated, with a weak broad cord at the outer edge of the umbilicus. The base is marked by the continuation of the axial sculpture. The umbilical wall is marked by rather strong, distantly spaced axial ribs and fine incremental lines. Aperture circular, decidedly protracted at the posterior angle; peristome thin all around. Operculum typically poterid.

The specimen figured, U.S.N.M. No. 356077, is one of three received from C. B. Adams. It has 5.2 whorls and measures: Height, 17.0 mm.; greater diameter, 24.7 mm.; lesser diameter, 19.0 mm.

The species appears confined to the southern coast of St. Elizabeth Parish, Jamaica. It is readily distinguished from the other non-corrugated Poterias by its strong lamellalike axial sculpture.

POTERIA (POTERIA) PLANA, new species

Plate 16, Figures 25–27

Shell small, helicoid, covered with a pale-brown periotracum. The nucleus consists of a single, moderately elevated, well-rounded, smooth turn. The succeeding turns are marked by slender, retractively curved axial riblets, which are inclined to waviness on the last turn, where indications of spiral threads are present. The postnuclear whorls are flattened on the posterior fourth, anterior to the summit. Suture strongly impressed, a little less so on the last whorl. Periphery well rounded and marked by the continuation of the axial sculpture. Base well rounded, openly umbilicated, with an obsolete cord at the periphery. The base is marked by a continuation of the axial riblets and indications of obselete spiral threads. The umbilical wall bears slender riblets. Aperture circular, oblique; peristome thin. Operculum typically poterid.

The type, U.S.N.M. No. 535976, was collected by Henderson at Montpelier, St. James Parish, Jamaica. It has 4.9 whorls and measures: Height, 12.5 mm.; greater diameter, 19.2 mm.; lesser diameter, 14.0 mm.

The species appears to be rather widely distributed. The specimens before me come from Westmoreland, Hanover, St. James, St. Elizabeth, and Trelawny Parishes. It resembles most nearly *P.* (*P.*) *crassa* (C. B. Adams), from which the flattening at the summit will readily distinguish it.

POTERIA (POTERIA) CRASSA (C. B. Adams)

Plate 16, Figures 16–18

1851. *Cyclostoma crassum* C. B. Adams, Ann. Lyc. Nat. Hist. New York, vol. 5, p. 59.
1852. *Cyclotus crassus* Pfeiffer, Monographia pneumonopomorum viventium, vol. 1, p. 29.
1855. *Cyclotus* (*Aperostoma*) *crassus* H. and A. Adams, The genera of recent Mollusca, vol. 2, p. 275.
1898. *Neocyclotus* (*Plectocyclotus*) *crassus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

Shell helicoid, small, brownish horn colored. The nucleus consists of a single well-rounded, rather elevated, smooth turn. The postnuclear whorls are marked by rather strong, retractively curved axial riblets, which are almost as wide as the spaces that separate them. These riblets become less strong and less regular on the last turn. Suture well impressed on all the whorls except the last part of the last whorl, which is appressed at the summit. Periphery well rounded. Base strongly rounded, openly umbilicated, with an obsolete cord at the outer edge of the umbilicus, marked by the weak continuation of the axial riblets, which also extend over the umbilical wall. Aperture subcircular, decidedly protracted at the posterior angle into an angle; outer lip of the peristome thin, the inner lip somewhat thickened. Operculum typically poterid.

We have figured Adams' type, which is in the collection at Amherst College. It has 5 whorls and measures: Height, 14.0 mm.; greater diameter, 19.0 mm.; lesser diameter, 14.9 mm., and is said to come from the interior of Manchester Parish, Jamaica.

The specimen resembles *P.* (*P.*) *plana* but is easily distinguished from that by the absence of flattening at the summit.

POTERIA (POTERIA) NODOSA (Chitty)

1857. *Cyclotus nodosus* Chitty, Proc. Zool. Soc. London, vol. 25, p. 157.

1898. *Neocyclotus* (*Plectocyclotus*) *nodosus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

I have not seen specimens referable to this species, so quote Chitty's description. He says that it came from Maroon Town, St. James Parish, Jamaica.

"*Form*, more depressed-conic. *Colour*, white, with light brown epidermis, brown at lip and on operculum. *Sculpture*, lines of growth, remarkably knotted corrugation on last whorl, pitted deep about umbilical keel, and coarse lines of growth within. *Spire*, depressed with rather straight outlines. *Whorls*, 5¼, well rounded, with deep suture. *Aperture*, rather oblique to the left below. *Peritreme*, slightly sinuate above. *Umbilicus*, wide, greatest breadth 0.3 [7.5 mm.], funnel-shaped. *Umbilical keel*, not wide, but well produced. *Operculum*, small, strong, sharp-edged lamina of 5 or 6 wide-apart whorls, rising almost equally from the flat plane, end of last thickened. Height 0.6 [15 mm.], greatest breadth 0.85 [21.25 mm.], least breadth 0.67 [16.75 mm.]."

This appears nearest to *P.* (*P.*) *corrugatissima* (Chitty), which occupies a range much to the south.

POTERIA (POTERIA) NOTATA (Chitty)

1857. *Cyclotus notatus* Chitty, Proc. Zool. Soc. London, vol. 25, p. 148.

1898. *Neocyclotus* (*Plectocyclotus*) *notatus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

I have not seen specimens referable to this species, so quote Chitty's description. He says it came from Trelawny, Jamaica.

"*Sculpture*, fine and almost smooth, with a slight corrugation on the upper part of latter half of the last whorl, which is devoid of depression in its upper part. *Umbilicus*, greatest breadth 0.17 [4.25 mm.], least breadth 0.16 [4.0 mm.]. *Umbilical keel*, almost obsolete. *Operculum*, character of *C. corrugatus*, more concave than preceding; spiral lamina, about 8 whorls, upper margin scarcely reflected. Height 0.58 [14.5 mm.], greatest breadth 0.64 [16.0 mm.], least breadth 0.56 [14.0 mm.]."

This may be a small subglobular race of *P. lineata* (Gray), occupying a range to the northeast of the typical form.

POTERIA (POTERIA) INUTILIS (Chitty)

1857. *Cyclotus inutilis* CHITTY, Proc. Zool. Soc. London, vol. 25, p. 155.
1898. *Neocyclotus* (*Plectocyclotus*) *inutilis* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

As I have not seen specimens referable to this species, I quote Chitty's description:

"*Form*, much depressed-conic. *Colour*, light brown; apex red-brown. *Sculpture*, fine lines of growth on the 3¼ whorls, thence (for its size) roughly corrugated, except the last quarter of last whorl, where, above, lines of growth are strong, with slight pitting; lines of growth fine within the umbilicus. *Spire*, much depressed, with convex outlines. *Whorls*, 4, well rounded, with very deep suture. *Aperture*, oblique from left to right below, dilated above and much expanded to the right, horizontally elliptical, 0.22 [5.5 mm.], 0.2 [5.0 mm.] vertically. *Peritreme*, rather sinuate above, and detached from the penult whorl. *Umbilicus*, open and large, greatest breadth 0.14 [3.5 mm.]. *Umbilical keel*, well defined inside umbilicus. *Operculum*, of *C. Jamaicensis* type, concave exteriorly, with lamella of 5 whorls, like *C. crassus*. Height 0.31 [7.75 mm.], greatest breadth 0.46 [11.5 mm.], least breadth 0.35 [8.75 mm.]"

This species seems to be allied to *P. lineata*, but because of its minute size it cannot be that species unless it should prove to be a dwarf of that form.

CYCLOBAKERIA, new subgenus

Poterias in which the spaces separating the turns of the lamella are not reenforced by raised threads.

Type: *Cyclotus novae-spei* Chitty=*Poteria (Cyclobakeria) novae-spei* (Chitty).

The distribution of this subgenus is peculiar, being confined to the two ends of the Island of Jamaica. Slight differences in the operculum of the species from the two regions may indicate that further division of this subgenus may be necessary. I am leaving the determination of this to the anatomists who may study the group.

The radula of *Poteria (Cyclobakeria) nana* has the following formula: 3:3:3:3, and the jaw lacks distinct median projections. The verge is situated on the back of the neck behind the tentacles. It is swollen basally and provided with a seminal groove and a very short simple terminal appendage.

KEY TO THE SPECIES OF SUBGENUS CYCLOBAKERIA

- Zigzag sculpture absent ---------- tryoniana
- Zigzag sculpture present.
  - Zigzag sculpture on last whorl feeble.
    - Zigzag sculpture on base pronounced ---------- novaespei
    - Zigzag sculpture on base not pronounced ---------- welchi
  - Zigzag sculpture on last whorl not feeble.
    - Basal keel strong.
      - Last part of base outside of keel with protractively curved cords.
        - Shell large, greater diameter more than 25 mm ---------- magister
        - Shell smaller, greater diameter less than 18 mm ---------- nana
      - Last part of base outside of keel without protractively curved cords ---------- dentistigmata
    - Basal keel feeble.
      - Lamella of operculum very broad, almost touching succeeding whorl ---------- chittyi
      - Lamella of operculum not very broad, not touching succeeding whorl.
        - Whorls slightly concave below summit ---------- notatior
        - Whorls not slightly concave below summit.
          - Spire helicoid ---------- yallahsensis
          - Spire depressed-helicoid ---------- balnearis

POTERIA (CYCLOBAKERIA) TRYONIANA (Pilsbry and Brown)

PLATE 16, FIGURES 22–24

1910. *Aperostoma* (*Ptychocochlis*) *tryonianum* PILSBRY and BROWN, Proc. Acad. Nat. Sci. Philadelphia, 1910, pp. 534–535.

Shell small, helicoid, covered with a golden-brown periostracum. The nucleus consists of a little more than 1.5 well-rounded, smooth turns. The postnuclear whorls are marked by slender, retractively curved, well-raised, rather distantly spaced axial riblets. On the last turn these riblets become less regular in size and spacing. Suture strongly constricted in all the whorls. Periphery well rounded, base strongly rounded, moderately broadly openly umbilicated, with a mere suggestion of a limiting keel at the outer edge of the umbilicus. The base and the umbilical wall are marked by the continuation of the axial riblets. Aperture circular, decidedly oblique, very slightly angulated at the posterior angle; peristome thin all around. Operculum typically cyclobakerid.

The unique type, Acad. Nat. Sci., Philadelphia, No. 101141, is without specific locality, bearing merely the label "Jamaica." It has 4.5 whorls and measures: Height, 9.7 mm.; greater diameter, 14.0 mm.; lesser diameter, 10.9 mm.

This species is easily separated from all the other Cyclobakerias as it has none of the zigzag sculpture characterizing the group.

POTERIA (CYCLOBAKERIA) NOVAESPEI (Chitty)

Plate 16, Figures 13–15

1857. *Cyclotus novae-spei* Chitty, Proc. Zool. Soc. London, vol. 25, p. 148.

1898. *Neocyclotus* (*Plectocyclotus*) *novae-spei* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

Shell of medium size, helicoid, covered by a chestnut-brown periostracum. The nucleus consists of a single well-rounded, smooth turn. The postnuclear whorls are inflated, strongly rounded; the first 2 postnuclear whorls are marked by feeble, hairlike, slightly retractively curved axial riblets. After this the axial riblets become less regular and wavy, owing to the additional sculpture. Beginning with the third postnuclear whorl irregular wrinkles make their appearance. These are most strongly emphasized near the suture and weakened toward the middle of the turn. There are also indications of spiral threads and pits. The suture on all but the last whorl is strongly impressed; on the last it is rendered less conspicuous by the fact that the summit of this whorl creeps up materially on the preceding turn, to which it is appressed. Periphery well rounded. Base inflated, strongly rounded, openly, moderately broadly umbilicated with a very strong lamellar keel at the outer limit of the umbilicus. The space immediately below this keel, within the umbilicus, is strongly excavated, while on the outside there is a strong impression. The base itself is marked by low zigzag wrinkles, which are strongest near the umbilical keel and fade toward the periphery. At the umbilical keel the spaces between these ridges are deeply impressed pits. The umbilical wall is marked by obsolete riblets and numerous hairlike incremental lines. Aperture circular, protracted into an angle at the posterior angle; the outer lip of the peristome thin, the inner somewhat thickened. Operculum typically cyclobakerid.

The specimen figured, Acad. Nat. Sci. Philadelphia, No. 174154, is one of three collected by H. B. Baker at Negril Hills, southwest of Retreat, Westmoreland Parish, Jamaica. It has 5 whorls and measures: Height, 16.2 mm.; greater diameter, 22.1 mm.; lesser diameter, 16.3 mm.

The species is confined to the southwestern coastal region of Westmoreland Parish.

POTERIA (CYCLOBAKERIA) WELCHI, new species

Shell of medium size, helicoid, covered with a chestnut-brown periostracum. The nucleus consists of a single well-rounded, smooth turn. The postnuclear whorls are marked by slender, rather closely approximated, slightly retractively slanting, hairlike riblets, which become decidedly irregular on the last whorl. Beginning with the third whorl rough wrinkles make their appearance on the upper surface of the whorls. These are strongest near the summit and extend protractively slanting toward the periphery, which they do not quite reach. The spaces separating these ridges are almost as wide as the ridges. Suture well impressed on all but the last turn. Here the summit is appressed and renders the suture less conspicuous. Periphery well rounded. Base moderately broadly umbilicated, well-rounded, and provided with a strong keel at the outer edge of the umbilicus. On the umbilical side of this keel the shell is decidedly excavated. From the umbilical keel protractively curved ridges radiate toward the periphery. These are very pronounced in the typical race and feebly expressed in the subspecies *P.* (*C.*) *welchi taylori*. The posterior portion of the base is smooth, except for indications of spiral lines. Aperture circular, decidedly oblique, protracted into an angle at the posterior angle. Operculum typically cyclobakerid.

I am recognizing two subspecies, which the following key and descriptions will help to differentiate:

KEY TO THE SUBSPECIES OF POTERIA (CYCLOBAKERIA) WELCHI

Pits outside of umbilical keel strong ---------------------------------- welchi
Pits outside of umbilical keel not strong ------------------------------ taylori

POTERIA (CYCLOBAKERIA) WELCHI WELCHI, new subspecies

PLATE 16, FIGURES 1–3

The typical race was collected by Welch on Dolphin Mountain, Jamaica, at an altitude of 1,200–1,450 feet. This mountain is located in the central western portion of Westmoreland Parish.

This subspecies differs from *P.* (*C.*) *w. taylori* in having the pits outside of the umbilical keel on the base very deep and the ridges bordering these very pronounced. Both of these characters are absent in *taylori*.

The type, U.S.N.M. No. 535977, from Dolphin Mountain, Jamaica, has 5.1 whorls and measures: Height, 20.0 mm.; greater diameter, 26.0 mm.; lesser diameter, 18.9 mm.

POTERIA (CYCLOBAKERIA) WELCHI TAYLORI, new subspecies

PLATE 17, FIGURES 37–39

This race was collected by C. B. Taylor and John B. Henderson in the Great Valley, Hanover Parish, Jamaica. It is easily differentiated from *P.* (*C.*) *w. welchi* by having the upper surface of the last whorl obsoletely nodulose on its anterior half, and by having the pits posterior to the umbilical keel very poorly indicated, and the radiating ridges bordering the pits almost absent.

The type, U.S.N.M. No. 535978, comes from Great Valley, Hanover Parish, Jamaica. It has 4.9 whorls and measures: Height, 16.0 mm.; greater diameter, 23.9 mm.; lesser diameter, 17.1 mm.

POTERIA (CYCLOBAKERIA) MAGISTER, new name

PLATE 17, FIGURES 40–42

1857. *Cyclotus corrugatus* CHITTY, Proc. Zool. Soc. London, vol. 25, p. 146 (not *Cyclostoma corrugatum* Menke, Synopsis methodica molluscorum, p. 39, 1830).

Shell very large, helicoid, wood brown, a little paler on the early whorls. The nucleus consists of a single well-rounded, smooth turn. The postnuclear whorls are inflated, strongly rounded, and marked by retractively curved axial riblets, which grow stronger as the shell increases in size and less regular, owing to the nodulations. Beginning with the fourth whorl, oblique, protractively slanting axial cords make their appearance. These fade out toward the summit and assume a zigzag course anteriorly; they become decidedly weaker on the last one-tenth of the last turn. Suture strongly impressed on all the whorls, except the last, which is decidedly appressed to the preceding turn, thus weakening the suture. Periphery well rounded, crossed by the axial protractive cords. Base inflated, strongly rounded, openly moderately broadly umblicated, with a strong keel at the outer edge of the umbilicus. The keel is strongly inpinched on the umbilical side and less so on the basal side. Radiating from the umbilical keel a series of strong cords about as wide as the spaces that separate them extends over the anterior fourth of the base and fades out toward its center. The posterior portion of the base shows the feeble continuation of the zigzag cords of the spire. The umbilical wall is marked by rough, closely spaced incremental threads. Aperture subcircular, protracted at the posterior angle into a decided point; outer lip thin, the inner thickened. Operculum typically cyclobakerid.

The type is one of six specimens in the Amherst College collection, labeled No. 7, collected by Chitty in Portland Parish, Jamaica. It has 5.1 whorls and measures: Height, 22.7 mm.; greater diameter, 31.0 mm.; lesser diameter, 23.1 mm.

The large size will readily distinguish this species from all the other known Cyclobakerias.

POTERIA (CYCLOBAKERIA) NANA, new species

PLATE 16, FIGURES 19–21

Shell quite small, helicoid, covered with a chestnut-brown periostracum. The nucleus consists of a single well-rounded, smooth turn. The postnuclear whorls are inflated, strongly rounded, and marked by slightly retractively slanting, closely spaced axial riblets, which at first are hairlike, and which on the last whorl become almost sublamellar. Beginning with the fourth whorl, protractive zigzag ridges make their appearance, which fade out toward the summit. The last whorl is decidedly appressed, and the portion that extends up on the preceding turn has a constriction bounding it which makes it appear cordlike. Suture strongly impressed, less so on the last turn on account of the appressed summit. Periphery well rounded and marked by the continuation of the zigzag cords. Base inflated, strongly rounded, rather narrowly umbilicated, and marked by strong protractive cords which are about as wide as the spaces that separate them and radiate from the umbilical keel toward the base. The posterior portion of the base is marked by the feeble continuation of the sculpture of the upper portion of the whorl. It also shows indications of spiral threads. The umbilical wall is marked by feeble riblets and numerous threadlike incremental lines. Aperture circular, oblique, decidedly protracted into an angle at the posterior angle; peristome of the outer lip protracted, thin; that of the inner lip somewhat thickened. Operculum typically cyclobakerid.

The type, U.S.N.M. No. 535979, is one of a series collected by Orcutt at Cousins Cove, Hanover Parish, Jamaica. It has 4.5 whorls and measures: Height, 11.8 mm.; greater diameter, 17.0 mm.; lesser diameter, 12.6 mm. The species appears to be restricted to the northwest coast of Hanover Parish.

POTERIA (CYCLOBAKERIA) DENTISTIGMATA (Chitty)

PLATE 17, FIGURES 34–36; PLATE 42, FIGURES 1–3

1857. *Cyclotus dentistigmatus* CHITTY, Proc. Zool. Soc. London, vol. 25, p. 154.

1898. *Neocyclotus* (*Plectocyclotus*) *dentistigmatus*, KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

Shell of medium size, helicoid, covered with a chestnut-brown periostracum; nuclear whorls scarlet red. The nucleus consists of 1.5 inflated, well-rounded, smooth turns. The postnuclear whorls are inflated, strongly rounded, and marked by rather coarse axial riblets. In addition to this, beginning with the second whorl, rugations make their appearance, which gradually increase in size. These ridges are less pronounced on the summit and grow stronger toward the periphery. They have a zigzag protractive slant. Suture well impressed, a little less so on the last turn, which is appressed to the preceding whorl. Periphery well rounded, marked by the feeble continuation of the axial sculpture. Base strongly inflated, strongly rounded, with a strong keel marking the outer edge of the moderately large umbilicus. The inner edge of this keel is decidedly inpinched, while the outer is bounded by a series of deep pits which give the shell the appearance of having been bitten by pointed teeth, hence the name. The spaces between these pits form cords which are poorly developed, short, and protractively bent. These cords disappear on the last portion of the last turn. The posterior portion of the base is without nodules. The umbilical wall is marked by rather pronounced axial riblets. Aperture subcircular, decidedly oblique, protracted into an angle at the posterior angle; the outer lip of the peristome is thin, the inner somewhat thickened. Operculum typically cyclobakerid.

The specimen figured, U.S.N.M. No. 401305, is one of a very large series collected by C. R. Orcutt 2½ miles east of Bath, St. Thomas Parish, Jamaica. It has 4.9 whorls and measures: Height, 16.2 mm.; greater diameter, 25.0 mm.; lesser diameter, 17.9 mm.

The species appears to extend over the entire southeastern portion of St. Thomas Parish.

POTERIA (CYCLOBAKERIA) CHITTYI, new species

PLATE 17, FIGURES 4–6

Shell small, helicoid, chestnut-brown; nuclear whorls paler. The nucleus consists of a single well-rounded, smooth turn. The postnuclear whorls are inflated, strongly rounded, and marked by hairlike, retractively slanting axial riblets, which increase in strength as the shell progresses in growth. Beginning with the third postnuclear whorl feeble axial riblets make their appearance, which increase in strength up to the last two-tenths of the last whorl, when they again fade out. These axial cords are arranged in a more or less zigzag pattern. Below the summit of the last turn, particularly toward the aperture, there is a slightly concave area. The last part of the last turn is marked by slender spiral threads. Suture of all but the last whorl strongly impressed; on this it is rendered less conspicuous by the appressed summit of the last turn. Periphery well rounded. Base strongly inflated, well rounded, rather narrowly openly umbilicated, with a feeble cord marking the outer edge of the umbilicus. The base is marked by obsolete nodulations and pittings. The umbilical wall is marked by numerous, irregular incremental lines. Aperture subcircular, protracted into an acute angle at the posterior angle; outer lip of peristome thin, the inner somewhat thickened. The operculum has the outer edge of the lamella decidedly expanded, approximating that of the succeeding turn.

The type, U.S.N.M. No. 378167, is one of a large series of almost all dead shells, collected by Orcutt at the western end of the Essington Bridge, St. Thomas Parish, Jamaica. It has 4.6 whorls and measures: Height, 14.0 mm.; greater diameter, 20.0 mm.; lesser diameter, 15.2 mm.

Charles R. Orcutt also collected specimens near Yallahs Bay, St. Thomas Parish.

POTERIA (CYCLOBAKERIA) NOTATIOR (Chitty)

PLATE 17, FIGURES 13–15

1857. *Cyclotus notatior* CHITTY, Proc. Zool. Soc. London, vol. 25, p. 148.

1899. *Neocyclotus* (*Plectocyclotus*) *notatior* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 31, p. 136.

Shell of medium size, rather elevated helicoid, wood brown. The nucleus consists of a little more than a single low, rounded turn. The postnuclear whorls are decidedly inflated and marked by retractively curved, hairlike, closely spaced axial riblets, which become irregularly disposed on the nodulose whorls. Beginning with the fourth postnuclear whorl, feeble nodulations make their appearance, which increase in size as the shell advances in growth. On the last whorl they assume first a retractive slant on the posterior portion near the summit, then they make a sudden protractive bend, but owing to the irregular development of these cords they have a zigzag appearance. These cords are not quite so wide as the spaces that separate them. On the last two-tenths of the last whorl they again fade out. Suture strongly impressed on all but the last whorl, which is decidedly appressed to the preceding turn. There is an impressed area below this appressed portion which renders that part of the shell slightly concave. Periphery well rounded and marked by the feeble continuation of the axial sculpture. Base inflated, strongly rounded, very narrowly umbilicated, and marked with a weak keel at the outer edge of the umbilicus. The base is marked by incremental lines and obsolete spiral striations. The umbilical wall bears many slender axial riblets. Aperture subcircular, decidedly oblique and decidedly protracted at the posterior angle. Outer lip thin and sharp at the edge; inner lip somewhat thicker. Operculum typically cyclobakerid.

The specimen figured, U.S.N.M. No. 535980, is one of the Adams collection labeled "*jamaicense* Sowerby." It has 4.5 whorls and measures: Height, 15 mm.; greater diameter, 20.8 mm.; lesser diameter, 16 mm.

Chitty's *notatior* came from St. Elizabeth Parish, Jamaica. Our specimen appears to agree with Chitty's diagnosis.

POTERIA (CYCLOBAKERIA) YALLAHSENSIS, new species

PLATE 17, FIGURES 16–18

1857. *Cyclotus notatior* var. *a* CHITTY, Proc. Zool. Soc. London, vol. 25, p. 148.

Shell very small, elevated helicoid, wood brown, with the nucleus pale buff, the succeeding turn pale chestnut-brown and the rest wood brown. The nucleus consists of a single well-rounded, smooth turn; the succeeding turns are marked by feeble, slightly retractively curved, closely spaced hairlines, those of the last whorl being a little stronger. Beginning with the last whorl, feeble nodulose cords make their appearance. These cords are more or less protractively curved but irregularly developed so as to produce a zigzag effect. Suture well impressed, except on the last whorl, which is appressed to the preceding whorl. Periphery well rounded, marked by the feeble continuation of the sculpture of the spire. Base inflated, strongly rounded, narrowly umbilicated, with a weak cord marking the outer edge of the umbilicus. The base is marked by lines of growth and a few indications of spiral threads. The umbilical wall is marked by strong, closely spaced incremental lines. Aperture decidedly oblique, protracted at the posterior angle to form an angle; peristome rather thin. Operculum typically cyclobakerid.

The type, U.S.N.M. No. 356093, comes from Yallahs River, St. Thomas Parish, Jamaica. It has 4.9 whorls and measures: Height, 11.0 mm.; greater diameter, 15.0 mm.; lesser diameter, 11.3 mm. Dr. Welch also collected a large series at White Horses, St. Andrew Parish.

This species can readily be distinguished from *P.* (*C.*) *notatior* (Chitty) by the absence of the depressed area below the summit.

POTERIA (CYCLOBAKERIA) BALNEARIS, new species

PLATE 17, FIGURES 7–9

Shell small, depressed-helicoid, covered with a dark wood-brown periostracum. The nucleus consists of a single well-rounded, smooth turn. The postnuclear whorls are well rounded and marked by retractively curved hairlike axial riblets. The last whorl also has feeble zigzag axial riblets, which do not come quite to the summit.

Suture well impressed, less so on the last half of the last turn, which is appressed to the summit. Periphery strongly rounded, marked by the feeble continuation of the axial riblets. Base inflated, strongly rounded, narrowly umbilicated with a weak cord marking the outer edge of the umbilicus. The base outside of the umbilicus shows a few weak pits outside of the basal cord and mere indications of obsolete nodulations, which fade out toward the end of the last turn. The umbilical wall is marked by moderately strong incremental lines. Aperture circular, protracted into a slight angle at the posterior angle; peristome somewhat thickened all around. Operculum typically cyclobakerid.

The type, U.S.N.M. No. 535981, was collected by Orcutt near Bath, St. Thomas Parish, Jamaica. It has lost part of the early turns; the 3 remaining measure: Height, 12.4 mm.; greater diameter, 16.6 mm.; lesser diameter, 13.2 mm.

The species seems to extend through the Morant Bay region, St. Thomas Parish.

Genus APEROSTOMA Troschel

1847. *Aperostoma* Troschel, Zeitschr. Malak., vol. 4, p. 44.

1847. *Aperostoma* Pfeiffer, *ibid.*, p. 47. (Type designation, *Cyclostoma* (*Aperostoma*) *blanchetianum* Moricand.)

1850. *Aperostoma* Petit, Journ. Conchyl., vol. 1, p. 38 (*C. giganteum* Sowerby designated as type).

1852. *Aperostoma* Herrmannsen, Indicis generum malacozoorum primordia, vol. 2, Suppl., p. 10 (*C. mexicanum* Menke designated as type).

Troschel (loc. cit.) in 1847 divided the cyclostomids into eight genera. On page 44 he created the genus *Aperostoma* and named three species under it, namely, *Cyclostoma volvulus* Lamarck, *C. mexicanum* Menke, and *C. blanchetianum* Moricand, without designating a type. Pfeiffer, in the article following Troschel's, discussed his own work on the group and commended Troschel's endeavors, which he accepted as sound, but he said that genus 4, *Aperostoma*, contains heterogeneous elements, namely, some with calcareous operculum and some with horny. He restricted the name *Aperostoma* to shells with a calcareous operculum. He placed those with a horny operculum in *Cyclophorus* Montford, citing as type *C. volvulus* Müller.

This restriction of *Aperostoma* Troschel removes *C. volvulus* Lamarck and *C. mexicanum* Menke from the genus and leaves only *C. blanchetianum* Moricand, which becomes its type.

KEY TO THE SUBGENERA OF WEST INDIAN APEROSTOMA

Umbilicus bounded by a keel	Cycladamsia
Umbilicus not bounded by a keel.	
Sculpture rugose	Austrocyclotus
Sculpture not rugose	Cyclohidalgoa

CYCLADAMSIA, new subgenus

Shells of this subgenus resemble *Neocyclotus* in shape and general sculpture of shell but differ in having a keel at the exterior limit of the umbilicus. Operculum covered on the outside with a thick calcareous deposit, which forms a weak ridge on the inner edge of the whorls and tapers outwardly, its surface being obliquely striated.

Type: *Cyclostoma seminudum* C. B. Adams = *Aperostoma* (*Cycladamsia*) *seminudum* (C. B. Adams).

The subgenus *Cycladamsia* appears confined to a strip of western Jamaica lying between longtitude 77°30′ and 78° W. and latitude 18° and 18°25′ N., except for two crab-carried specimens from Montego Bay, which is a little farther north.

The radula of *Aperostoma* (*Cycladamsia*) *seminudum seminudum* (C. B. Adams) and *A.* (*C.*) *seminudum scabratum* have the formula 3 : 3 : 3 : 3, and the jaw without median projection.

KEY TO THE SPECIES OF SUBGENUS CYCLADAMSIA

- Whorls strongly pitted or malleated.
  - Last fourth of base of last whorl with regular oblique ridges.
    - Oblique ridges extending from umbilical keel to periphery ------ ruber
    - Oblique ridges not extending from umbilical keel to periphery ------ bairdianum
  - Last fourth of base of last whorl without regular oblique ridges.
    - Shell large, greater diameter more than 23 mm ------ seminudum
    - Shell smaller, greater diameter less than 20 mm ------ fossile
- Whorls not strongly pitted or malleated ------ rudisplanusque

APEROSTOMA (CYCLADAMSIA) RUBER (Chitty)

Shell helicoid. Nuclear whorls 1.3, small, well rounded, smooth; the first half postnuclear whorl with slender, retractively curved axial riblets, which are separted by spaces about as wide as the riblets. This stage is followed by a turn in which the axial sculpture becomes irregular and the ribs obsolete, then by a wrinkled and pitted stage that continues to the end of the last whorl. In the early portion of this stage the wrinkles are more or less regular and decidedly retractively curved. They are not of uniform development, which condition gives the spaces between the wrinkles a pitted aspect. The summit of the whorls is appressed; the suture is not impressed, Periphery well rounded. Base well rounded, openly umbilicated, the umbilicus marked by a strong cord at its outer termination. The cord within the umbilicus is pinched in. The sculpture of the base consists of decidedly obliquely retractively curved cords, which are wavy and feebly nodulose, enclosing spaces of a little less width between them, which have a somewhat pitted aspect. The umbilical wall is marked by strong, curved, rugose incremental ridges. Aperture oblique, subcircular and angled at the posterior angle; peristome slightly thickened on the outer and basal lip and somewhat emarginulate on the parietal wall. Operculum typically cycladamsid.

This species is nearest related to *A.* (*C.*) *bairdianum* (Chitty), from which it can be distinguished by the fact that the oblique ridges on the last whorl cross the periphery undiminished. In *bairdianum* they vanish on the base before reaching the periphery.

I am recognizing two subspecies, which the following key and descriptions will help to differentiate:

KEY TO THE SUBSPECIES OF APEROSTOMA (CYCLADAMSIA) RUBER

Shell large, greater diameter more than 21 mm.......................... **ruber**
Shell smaller, greater diameter less than 18 mm...................... **pretiosum**

APEROSTOMA (CYCLADAMSIA) RUBER RUBER (Chitty)

Plate 17, Figures 31–33

1857. *Cyclotus ruber* Chitty, Proc. Zool. Soc. London, vol. 25, p. 153.

This subspecies has the early whorls pale brown; the part of the periostracum remaining is chestnut-brown. In denuded specimens the shell is flesh colored, with a pale brownish tinge and usually with several broad bands of dark brown, the periphery appearing as a lighter zone.

This subspecies is distinguished from *A.* (*C.*) *ruber pretiosum* (Chitty) by its much larger size.

Chitty cites Westmoreland as type locality. Westmoreland is the westernmost as well as one of the largest parishes of Jamaica. An absence of a definite locality makes it not unlikely that his shells came from the St. Elizabeth Parish border. The specimen figured, U.S.N.M. No. 535982, is from the C. B. Adams collection at Amherst and bears the label *C. seminudum* Adams var., St. Elizabeths Jamaica, E. Chitty donor! This has 5 whorls and measures: Height, 15.3 mm.; greater diameter, 22.0 mm.; lesser diameter, 16.1 mm.

It must be remembered that Adams visited Chitty and obtained many specimens from him. Chitty did not venture to enter the descriptive field until after Adams' death. We know that Chitty described material from New Hope, Westmoreland, which is near the southeastern border of Westmoreland. All the material that we have seen with definite locality comes from the region of Carisbrook, St. Elizabeth.

APEROSTOMA (CYCLADAMSIA) RUBER PRETIOSUM (Chitty)

Plate 17, Figures 25–27

1857. *Cyclotus pretiosus* Chitty, Proc. Zool. Soc. London, vol. 25, p. 153.

In type of sculpture this subspecies corresponds in every way with that of typical *ruber*. It differs from it mainly in its much more diminutive size.

The specimen figured, U.S.N.M. No. 400998, was collected by C. R. Orcutt on a tall hill near Maggotty, St. Elizabeth Parish, Jamaica. It has 3.4 whorls remaining and measures: Height, 8.5 mm.; greater diameter, 15.0 mm.; lesser diameter, 11.2 mm.

In his description Chitty cites New Hope, Westmoreland, as type locality. We have not seen specimens from New Hope, but we do have lots from three adjoining parts of St. Elizabeth Parish, namely, Maggotty, Cheltenham, and a road cut 4 miles north of Black River.

APEROSTOMA (CYCLADAMSIA) BAIRDIANUM (Chitty)

Pate 17, Figures 28–30

1857. *Cyclotus bairdianus* Chitty, Proc. Zool. Soc. London, vol. 25, p. 153.

Shell helicoid, of medium size, "of rich red brown color, with sometimes a lighter band at the periphery and around the umbilical keel, yellowish at the suture of the last whorl" (Chitty). The nucleus consists of about one turn. The first postnuclear whorl is marked by retractively curved axial riblets, which are a little broader than the spaces that separate them. The whorl succeeding shows lines of growth, which are strongest at the summit, and malleations on the rest of the shell. This type of sculpture continues to the aperture, but becomes intensified and developed more or less into strong wrinkles. Suture moderately impressed. Periphery well rounded. Base well rounded, openly umbilicated and marked with a very strong keel at the outer edge of the umbilicus and decidedly pinched in below the keel in the umbilicus. The base is marked by pittings which extend to the periphery. On the last one-fifth of a turn there are also strong decidedly retractively curved axial cords, which are separated by spaces about as wide as the cord. These vanish before reaching the periphery. The umbilical wall is marked by irregular lines of growth which render it rather rough. Aperture oblique, circular, with a feeble angle at the posterior angle, slightly emarginated below the summit on the outer lip and slightly excavated on the columellar wall. Operculum typically cycladamsid.

Chitty failed to cite any locality with his description. Three specimens before me from the Adams collection mixed with "*C.*

varians Ads." No. 14, come from Accompong Town, St. Elizabeth Parish. Adams credits them to Chitty as donor. Our specimens were collected by Orcutt at Maggotty, St. Elizabeth Parish, about 5 miles south of Accompong.

The specimen figured, U.S.N.M. No. 535983, comes from Maggotty, St. Elizabeth Parish. It has 4.5 whorls and measures: Height, 12.0 mm.; greater diameter, 17.0 mm.; lesser diameter, 13.0 mm. These meet most nearly the measurements cited by Adams. There are, however, larger individuals obtained at the same locality. One of these has 5 turns and measures: Height, 14.8 mm.; greater diameter, 21.4 mm.; lesser diameter, 16.2 mm.

This species belongs to the group in which the basal sculpture near the aperture consists of parallel, retractively slanting cords. This character it shares with *A.* (*C.*) *ruber* (Chitty), from which it differs in having much feebler sculpture on the latter portion of the spire as well as the base.

APEROSTOMA (CYCLADAMSIA) SEMINUDUM (C. B. Adams)

Shell varying greatly in shape, which ranges in outline from depressed-helicoid to subglobular. The color is also decidedly variable, ranging from unicolor to banded, the light area usually being flesh colored or buff, the darker chestnut-brown. The sculpture is likewise immensely variable. The nucleus is small, usually consisting of a turn or a turn and a half, which is smooth. The succeeding postnuclear whorl is marked by finely, retractively curved, rather closely spaced axial riblets, and from there on the remaining whorls show rough lines of growth and numerous wrinkles, malleations, and pittings. The strength of these elements varies very materially. In some specimens they become decidedly enfeebled toward the periphery of the last turn; in others, they remain conspicuous. The suture is moderately impressed. Periphery well rounded, smooth in some individuals; in other individuals, pitted. Base well rounded, openly umbilicated, the umbilicus varying materially in size. In one of the races it is exceedingly broad, while in another it is quite narrow. A strong keel marks the outer limits of the umbilicus. The umbilical edge of this keel is deeply impressed. The base varies materially in sculpture; in some the posterior half is practically smooth; in others, it is strongly pitted and decidedly rough. The umbilical wall is marked by strong riblike incremental elements. The aperture is subcircular, somewhat angulated at the posterior angle; in some individuals there is a decided sinus on the outer lip a little below the summit; in others it is absent. The columellar wall is slightly excavated. Operculum typically cycladamsid, but differing materially in the concavity of its outer surface, which ranges from almost flat to decidedly concave.

This species presents a difficult problem to the taxonomist, for I was unable to find sharp, clearly cut geographic races, but I did find intergrading elements in all the characters mentioned; that is, elevation, width of umbilicus, intensity of sculpture or partial absence thereof.

I am recognizing four subspecies, which appear to have more or less of a zoogeographic locus:

KEY TO THE SUBSPECIES OF APEROSTOMA (CYCLADAMSIA) SEMINUDUM

Periphery strongly sculptured.	
Spire helicoid	scabratum
Spire depressed-helicoid	humile
Periphery not strongly sculptured.	
Umbilicus narrow	deburghaeanum
Umbilicus not narrow	seminudum

APEROSTOMA (CYCLADAMSIA) SEMINUDUM SCABRATUM, new subspecies

Plate 18, Figures 26–28

This subspecies has a well-elevated, helicoid outline and is exceedingly roughly sculptured, the pitting extending over the periphery. It is easily distinguished from *A.* (*C.*) *s. humile*, which also has the pitting extending over the periphery, by its elevated form.

The type, U.S.N.M. No. 535984, was collected by Dr. Welch at The Alps, Trelawny Parish, Jamaica. It has 5 whorls and measures: Height, 18.7 mm.; greater diameter, 26.0 mm.; lesser diameter, 19.3 mm.

Welch also collected this race at Croydon, east-central Trelawny Parish. Both of these localities represent the northeastern known limit of the subspecies.

APEROSTOMA (CYCLADAMSIA) SEMINUDUM HUMILE, new subspecies

Plate 18, Figures 29–31

This subspecies has the shell decidedly depressed and finely roughly sculptured, the pitting and wrinkling extending over the periphery. It also has an exceedingly wide umbilicus. The depressed form and large umbilicus and finer sculpture will distinguish this race from *A.* (*C.*) *seminudum scabratum.*

The type, U.S.N.M. No. 535985, has 5 whorls and measures: Height, 15.2 mm.; greater diameter, 25.6 mm.; lesser diameter, 19.0 mm. It was collected by Dr. d'Alté Welch at Kyle, St. Elizabeth Parish, Jamaica.

This race was collected by C. R. Orcutt at Carisbrook and by Dr. Welch at Kyle and Bartons. It therefore seems to occupy the north-central portion of St. Elizabeth Parish.

APEROSTOMA (CYCLADAMSIA) SEMINUDUM DEBURGHAEANUM (Chitty)

Plate 18, Figures 35–37

1857. *Cyclotus deburghaeanus* Chitty, Proc. Zool. Soc. London, vol. 25, p. 151.

This subspecies was differentiated from typical *seminudum* by Chitty chiefly on the basis of its more elevated form, narrower umbilicus, and flatter operculum, and possibly a little feebler sculpture of the base, for in both of these subspecies there is a tendency toward obsoleteness of sculpture. I have found in examining series of specimens that the relative concavity of the operculum is a variable element, and the width of the umbilicus is also variable, as is the elevation, and for this reason I am relegating Chitty's species to subspecific rank.

The specimen figured, U.S.N.M. No. 535986, was collected by Dr. Welch west of Headings, Trelawny Parish, Jamaica. This has 5 whorls and measures: Height, 20.0 mm.; greater diameter, 25.3 mm.; lesser diameter, 18.0 mm.

Chitty cites Westmoreland (?) as the type locality. I believe that it occupies northern Manchester and southern Trelawny Parishes, extending into the edge of southeastern St. James Parish.

APEROSTOMA (CYCLADAMSIA) SEMINUDUM SEMINUDUM (C. B. Adams)

Plate 18, Figures 32–34; Plate 42, Figures 4, 5

1851. *Cyclostoma seminudum* C. B. Adams, Ann. Lyc. Nat. Hist. New York, vol. 5, p. 59.

This subspecies is a little less elevated than *A.* (*C.*) *seminudum deburghaeanum* (Chitty) and a little more roughly sculptured. It also has a much broader umbilicus and it, like *deburghaeanum*, has a feeble sculpture on the base, where it fails to extend to the periphery.

Adams cites Manchester, Jamaica, as the type locality. Chitty, in restricting *seminudum*, says that it comes from the northwest border of Manchester Parish; he specifically mentions Bogue Hill. I believe that this subspecies ranges from Somerset, Manchester Parish, in a northwesterly direction to Phoenix, St. James Parish.

The specimen figured, U.S.N.M. No. 6642, was received from C. B. Adams. It has 5 whorls and measures: Height, 16.0 mm.; greater diameter, 23.5 mm.; lesser diameter, 18.1 mm.

APEROSTOMA (CYCLADAMSIA) FOSSILE, new species

PLATE 18, FIGURES 22–24

Shell of medium size, helicoid, yellowish white. The nucleus consists of a little more than one turn; the next two turns are marked by well-rounded, retractively curved axial riblets, which are a little wider than the spaces that separate them. The next whorl is marked by strong rough wrinkles at the summit. The rest of the whorls are marked by retractively curved cords, which are slightly wavy and slightly nodulose, producing a somewhat pitted effect on the general surface. The last half of the last turn is very roughly sculptured. The wrinkles at the summit are intensified, and the rest loses its regular retractively curved ribbing, which is replaced with irregular wrinkles, malleations, and pits. Suture well impressed. Periphery well rounded. Base well rounded, broadly openly umbilicated with a moderately strong cord marking the outer limit of the umbilicus. The base of the early part of the last whorl is marked by the continuation of the axial cords referred to for the spire, and the same type of pitting between them. The regularity of the disposition of these elements disappears on the last half, where a similar type of pitting and nodulation is present, but no regular distribution of these elements obtains. The umbilical wall is marked by wavy strong axial ribs. Aperture very large, somewhat channeled at the posterior angle and slightly excavated on the columellar wall. Operculum unknown.

The type, U.S.N.M. No. 535987, and a large series of specimens, U.S.N.M. No. 375436, were obtained by Mr. Orcutt from fossiliferous sand sifting in a cave north of One Eye River Sink, near Balaclava, Manchester Parish, Jamaica. The type has 4.5 whorls and measures: Height, 11.7 mm.; greater diameter, 18.2 mm.; lesser diameter, 13.9 mm.

An additional lot, U.S.N.M. No. 397355, was obtained on a hill north of One Eye River Sink below the cave in crevices in the precipice.

This species belongs to the *seminudum* group, as far as the type of sculpture is concerned, but differs from it in the larger aperture and the much stronger umbilical sculpture and also in having the sculpture of the spire and base finer. It is evidently a fossil. Orcutt failed to find living specimens of it in the region.

APEROSTOMA (CYCLADAMSIA) RUDISPLANUSQUE (Chitty)

PLATE 18, FIGURES 13–18

1857. *Cyclotus rudis-planusque* CHITTY, Proc. Zool. Soc. London, vol. 25, p. 152.

Shell small or medium sized, helicoid. When perfect, covered with a wood-brown periostracum, which may be streaked with axial darker shades of brown. The nucleus consists of a little more than one turn, which is small and well rounded. The next turn is marked by very fine, retractively curved, closely spaced, almost hairlike riblets, while the rest of the shell bears irregular rugations and scattered malleations, the latter usually a little below the summit. The rugations are strongest near the summit of the shell. Suture well impressed. Periphery well rounded. Base well rounded, moderately broadly umbilicated. The umbilicus is bounded by a strong keel, which is strongly inpinched on the umbilical side and rendered somewhat nodulose by the irregular axial sculpture. The umbilical wall is marked by irregular axial ribs. Aperture large, subcircular, except for an angulation at the posterior angle, feebly incised below the summit on the outer lip and somewhat incised on the columellar wall. Operculum typically cycladamsid.

The two specimens figured, U.S.N.M. No. 356132, are part of four from Mulgrave, St. Elizabeth Parish, Jamaica. I have selected these to show the limit of variation in size and also in intensity of sculpture. The larger has 5 whorls, the smaller 4.3. They measure, respectively: Height, 13.3 and 9.2 mm.; greater diameter, 18.6 and 13.2 mm.; lesser diameter, 14.0 and 10.2 mm.

This species is easily distinguished from the other Cycladamsias by its extremely reduced sculpture.

Chitty cites Accompong Town, St. Elizabeth Parish, as type locality. This appears to be the center of its distribution. Some crab-carried (?) specimens were collected at Montego Bay, St. James Parish. The living material seen extends from Mocho to Maggoty, but we also have some dead specimens from 4 miles north of Black River, St. Elizabeth Parish, and Glen Burnie Mountains, Westmoreland Parish.

This species presents a puzzle that will be cleared up only when anatomic material comes to hand for dissection. There are two distinct sizes, a large and a small element. It is possible that these may be sexual characteristics. The occurrence of both in the same locality points toward such a condition.

AUSTROCYCLOTUS, new subgenus

Aperostomine shells of helicoid shape the outside surface of which is marked by closely placed threads crossing each other in protractive and retractive series, producing an engine-turned pattern.

Type: *Aperostoma* (*Austrocyclotus*) *stramineum* (Reeve).

Distribution: Panama to Ecuador and Venezuela and the West Indies.

The radula formula of *Aperostoma* (*Austrocyclotus*) *grenadense mcsweeni* is 3:3:3:2. The jaw is without a median projection.

The verge is situated on the back of the neck behind the tentacles. It is swollen basally and provided with a seminal groove and a very short simple terminal appendage.

KEY TO THE WEST INDIAN SPECIES OF THE SUBGENUS AUSTROCYCLOTUS

Sculpture very strong and filelike------------------------------------ rugatum
Sculpture not as strong or filelike.
  Shell averaging more than 20 mm. in diameter-------------- vincentinum
  Shell averaging less than 15 mm. in diameter----------------- grenadense

APEROSTOMA (AUSTROCYCLOTUS) RUGATUM (Guppy)

Plate 17, Figures 10–12

1864. *Cyclotus rugatus* Guppy, Ann. Mag. Nat. Hist., ser. 3, vol. 14, p. 246.

Shell of medium size, depressed-helicoid, openly, moderately, broadly, umbilicated, covered by a golden-brown periostracum. Nuclear whorls 1.5, well rounded, smooth, forming a moderately elevated spire. Postnuclear whorls inflated, strongly rounded, strongly inbent at the suture excepting the last fifth of the last turn, which is marked by rather strong, decidedly retractively curved axial riblets. On the last whorl the riblets are replaced by more or less zigzagging ridges separated by spaces equaling them. This zigzagging produces a filelike resemblance. On the last fifth of a turn these elements become much disturbed and finally obsolete. Suture strongly impressed; periphery strongly rounded. Base inflated, strongly rounded, and marked by the continuation of the sculpture at the spire. Umbilical wall marked by closely spaced axial cords. Aperture oblique, almost circular, slightly angulated at the posterior angle. Peristome simple. Operculum typically austrocyclotid.

I collected the specimen described and figured, U.S.N.M. No. 390108, at Brigham Hill, Central Range, Trinidad, on September 2, 1928. It has 4.4 whorls and measures: Height, 12.9 mm.; greater diameter, 17.5 mm.; lesser diameter, 15.6 mm. I took three additional specimens, U.S.N.M. No. 394005, on Verdant Vale, about 4 miles north of Arima, Trinidad, on September 3, 1929.

This species is much more robust and rotund, with the sculpture much coarser and rougher, than *A.* (*A.*) *grenadense* (Shuttleworth).

APEROSTOMA (AUSTROCYCLOTUS) VINCENTINUM (Pilsbry)

Plate 17, Figures 1–3

1935. *Poteria vincentina* Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, vol. 87, p. 4, pl. 1, figs. 2, 2a.

Shell rather large, depressed-helicoid. Nuclear whorls almost 2, smooth, well rounded. Postnuclear whorls marked by numerous, wavy, slender, raised, retractively slanting axial threads, which are disposed in a more or less zigzag pattern, and lend to the surface a worn-file effect. Suture well constricted. Periphery somewhat inflated, strongly rounded. Base strongly rounded, marked by the continuation of the sculpture described for the spire. Umbilicus broad, open. Aperture almost circular, somewhat angulated at the posterior angle; peristome thin, slightly reflected, a little thicker on the columellar wall, adnate to the preceding turn at the parietal wall. Operculum typically austrocyclotid.

The specimen described and figured, U.S.N.M. No. 535919, was collected by Bartsch on Mount St. Andrews, St. Vincent. It has 4.4 whorls and measures: Height, 13.7 mm.; greater diameter, 22.7 mm.; lesser diameter, 17.1 mm.

This species recalls most nearly *A.* (*A.*) *grenadense* (Shuttleworth), from which its much larger size will readily distinguish it.

APEROSTOMA (AUSTROCYCLOTUS) GRENADENSE (Shuttleworth)

Shell small, depressed-helicoid, openly moderately broadly umbilicated. Nuclear whorls about 2, well rounded, smooth, conforming in increase with the rest of the spire. Postnuclear whorls slightly flattened near the suture, the rest well rounded, marked by incremental lines and obliquely slanting, low, elongated tubercles, which lend the surface a wrinkled appearance. This sculpture usually weakens toward the last tenth of a turn, where the incremental lines become much rougher and irregular. Periphery of last whorl well rounded. Base strongly rounded, marked like the spire. On the umbilical wall the tuberculations may weaken. Aperture broadly ovate, somewhat pointed at the posterior angle. Peristome acute. Operculum of about six whorls, typically austrocyclotid.

The species appears confined to Grenada. I am recognizing two subspecies:

KEY TO THE SUBSPECIES OF APEROSTOMA (AUSTROCYCLOTUS) GRENADENSE

Base strongly granulose	grenadense
Base not strongly granulose	mcsweeni

APEROSTOMA (AUSTROCYCLOTUS) GRENADENSE GRENADENSE (Shuttleworth)

PLATE 17, FIGURES 19–21

1857. *Cyclostoma* (*Cyclotus*) *grenadense* SHUTTLEWORTH, Journ. Conchyl., vol. 5, p. 266.

This subspecies is differentiated from *Aperostoma* (*Austrocyclotus*) *grenadense mcsweeni* by having the base strongly granulose.

I collected it in large numbers, U.S.N.M No. 473940, under heaps of leaves and branches in the Cacao plantation on the Annandale Estate, August 25, 1929, and a small number, U.S.N.M. No. 390105, at a much higher elevation at Granitown House, August 25, 1929. The latter average a little smaller and stronger sculptured. Both of these localities are on the western slope of Grenada.

U.S.N.M. No. 57768 contains two specimens received from Bland; US.N.M. No. 366504 contains eight specimens, and U.S.N.M. No. 366503 two specimens from Vendryes. None of these lots bear specific locality data, only the label Grenada, but all belong to this race.

Ten specimens from the Annandale lot yield the following measurements:

Height	Greater diameter	Lesser diameter
Mm.	*Mm.*	*Mm.*
10. 2	15. 8	11. 6
10. 6	16. 2	12. 4
10. 9	15. 7	12. 4
11. 0	14. 7	11. 4
10. 9	14. 4	11. 2
8. 9	14. 1	10. 1
8. 3	13. 3	9. 3
8. 4	13. 0	9. 6
7. 9	12. 6	9. 4
7. 9	12. 1	8. 9

Of the animal of this subspecies from the Annandale estate, my notes say: "Dorsal parts pale rose color, sides a little paler, sole of foot rose colored with a buffish tinge; tentacles crimson."

APEROSTOMA (AUSTROCYCLOTUS) GRENADENSE MCSWEENI, new subspecies

Plate 17, Figures 22–24

Shell agreeing with typical *A.* (*A.*) *grenadense grenadense* (Shuttleworth) in size and shape but differing from it in having the sculpture of the spire a little less strong, while that of the base is very much reduced. I found these characters common to the specimens collected on the east slope of Grenada. My largest series, U.S.N.M. No. 473942, was obtained in a cacao plantation under the collected heaps of dead leaves and branches of Baltazar, August 25, 1929. My notes say of the animal, "Coloration the same as that of the specimens obtained at the Annandale estate."

I collected the type, U.S.N.M. No. 474038, on the estate of Dr. Edgar deJ. McSween, one of my medical students now residing in Grenada, and I gratefully acknowledge his helpfulness during my sojourn there. The type has 4.3 whorls and its measurements are cited below, together with those of a series of specimens obtained at the same place:

Height	Greater diameter	Lesser diameter
Mm.	*Mm.*	*Mm.*
11. 1	15. 8	12. 1 (type)
11. 2	16. 3	13. 0
12. 1	16. 8	13. 4
10. 8	17. 0	12. 8
10. 1	16. 3	12. 6
11. 5	16. 5	12. 6
10. 5	16. 0	12. 6
10. 4	15. 0	11. 8
9. 0	14. 7	11. 3
8. 2	13. 9	9. 7

Small specimens come from Telescope Hill on the northeast coast, U.S.N.M. No. 307501. Gerrit S. Miller, Jr., collected representatives at Mount Pleasant at an altitude of 1,500 feet, U.S.N.M. No. 360782. Professor Summers collected specimens at an altitude of 700 feet, without mentioning specific locality, U.S.N.M. No. 356045.

CYCLOHIDALGOA, new subgenus

Aperostomas of helicoid shape with closely crowded axial riblets.

Type: *Aperostoma* (*Cyclohidalgoa*) *translucidum* (Sowerby).

Distribution: Colombia, Venezuela, British Guiana, Trinidad, and Margarita Island.

Guppy showed the radula formula to be 3 : 3 : 3 : 3.

APEROSTOMA (CYCLOHIDALGOA) TRANSLUCIDUM TRINITENSE (Guppy)

PLATE 18, FIGURES 7–12

1864. *Cyclotus trinitensis* GUPPY, Ann. Mag. Nat. Hist., ser. 3, vol. 14, p. 245.

1923. *Poteria translucida trinitensis* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, pp. 31–33, pl. 5, figs. B and C.

Baker, in discussing the mainland forms of this species, recognizes the subspecific distinctness of the Trinidad race, stating, "Shell more depressed; suture distinctly impressed; whorls convex." The group is an exceedingly difficult one, the proper elucidation of which may be furnished when enough anatomic data has been adduced.

Guppy describes the Trinidad animal as follows: "The *animal* is of a pinkish colour, which is most pronounced about the tentacles. The eyes are small and black. The mouth is provided with an amber-coloured, somewhat triangular mandible, divided into two parts by a median fissure, from which diverge slightly curved rows of minute denticulations strongly resembling the lingual teeth of some Helicidae.

"The lingual teeth are 3. 1. 3, in arched rows: central broad, tridentate; 1st lateral broad, bidentate, with a base much produced outwardly; 2nd tridentate; 3rd much hooked and reflexed, tridentate."

I collected semifossil specimens on the bluffs in a quarry on the south side of the road between Pampator and Asuncion on Margarita Island. I failed to find living specimens anywhere on the parts of the island visited.

INCERTICYCLUS, a pseudogeneric term

Members of the family Cyclophoridae as a rule require a knowledge of the operculum to enable one to assign them to the proper generic and subgeneric groups. Since specimens not infrequently drift into museums without this door, and the rest of the shell characters may fail to enable one to locate the shell in question, I propose the above name as a superspecific designation for species that have been christened but that in our monographic endeavors we are unable to locate properly for lack of the characters mentioned.

Incerticyclus is not to be considered a genus, nor is it ever to have a type, but is to remain an open catch-all into which we may place those species the position of which we are uncertain. When the necessary characters have been adduced these species can be properly aligned, taken out of *Incerticyclus*, and when new material without opercula is received, it can be placed in this group.

I am placing the following species in *Incerticyclus:*

INCERTICYCLUS BAKERI (Simpson)

PLATE 18, FIGURES 1–3

1895. *Neocyclotus (Ptychocochlis) bakeri* SIMPSON, Proc. U. S. Nat. Mus., vol. 17, p. 449, pl. 16, figs. 1, 2.

Shell large, helicoid; nuclear whorls lost. The early postnuclear whorls are marked by wavy or slightly zigzag, retractively slanting, slender axial riblets, which are well developed, quite regular and regularly spaced, and separated by spaces about as wide as the riblets. On the last half of the last turn, however, there appears another type of sculpture consisting of strong wrinkles, the first part of which is retractive, then vertical, then again sloping retractively to the periphery. These wrinkles vary materially in strength. Suture moderately well impressed. Periphery well rounded. Base well rounded, openly umbilicated, and marked by decidedly retractively curved, very regular ridges, which pass over the umbilical angle strongly onto the umbilical wall. These ridges are about as wide as the spaces that separate them. In addition to this the entire base is marked by fine incremental lines. There is scarcely a suggestion of the angle at the outer edge of the umbilicus present. Aperture circular; peristome thin. Operculum?

The type, U.S.N.M. No. 115717, was collected by John B. Henderson in the marl stratum of the Bowden Beds, Miocene, in St. Thomas Parish, Jamaica. It has 3.4 whorls remaining and measures: Height, 16.3 mm.; greater diameter, 30.0 mm.; lesser diameter, 20.0 mm.

The peculiar sculpture combined with the absence of the umbilical keel separates this species from all the other known Jamaican cyclophorids.

INCERTICYCLUS BOWDENENSIS, new species

Plate 41, Figures 4–6

Shell small, helicoid, yellowish white. Nuclear whorls decollated. The early postnuclear whorls somewhat impressed at the summit; the last appressed. The early whorls are marked by slender, hairlike incremental lines. Beginning with the last half of the penultimate turn, decidedly obliquely protractively slanting axial rugae make their appearance. They take a sudden retractive slant near the summit where they are weaker and less regular. Periphery rounded. Base strongly rounded, openly umbilicated, and marked by lines of growth only. A rather strong, somewhat notched, moderately broad keel forms the outer edge of the umbilicus, while the umbilical wall is marked by riblike gatherings of the incremental lines. Aperture circular, oblique; peristome simple, thickened to form an auricle at the posterior angle.

The type, Acad. Nat. Sci. Philadelphia No. 82532a, was collected by Uselma C. Smith and S. L. Schermo in the Miocene formation at Bowden, Jamaica. It has 3.5 whorls remaining and measures: Height, 10.8 mm.; greater diameter, 15.7 mm.; lesser diameter, 12 mm.

Its lesser size and comparatively weak sculpture will readily distinguish it from *Incerticyclus bakeri* (Simpson) and *I. schermoi.*

INCERTICYCLUS SCHERMOI, new species

Plate 41, Figures 10–12

Shell of medium size, helicoid, cream yellow. Nuclear whorls 1.5, small, well rounded, smooth. Postnuclear whorls well rounded; all but the last turn marked by very strong, slightly retractively curved axial riblets, which are less than half as wide as the spaces separating them. The last whorl is very roughly wrinkled. The axial ribs persist and are even stronger than on the preceding whorls, but they are rendered irregular by decidedly obliquely protractively slanting folds. The latter are not quite so broad as the spaces separating them. Periphery well rounded. Base strongly rounded, openly umbilicated with a very strong keel at the outer edge of the umbilicus. Deep pits are present at the keel, which extend as impressed grooves over the anterior third of the base. Anterior to the keel the umbilical wall is also deeply pitted and the impressed areas extending from the pits over the umbilical wall let the intermediate space appear as ribs marked by incremental lines. Aperture oblique, circular.

The type, Acad. Nat. Sci. Philadelphia No. 82532, was collected by Uselma C. Smith and S. L. Schermo in the Miocene beds at Bowden, Jamaica. It has 4.4 whorls and measures: Height, 13 mm.; greater diameter, 19.8 mm.; lesser diameter, 15.3 mm. Thirteen young and fragmentary specimens are registered under the same number.

The strong basal sculpture readily differentiates this from *Incerticyclus bowdenensis* and the strong spiral keel at the umbilicus separates it from *Incerticyclus bakeri* (Simpson).

INCERTICYCLUS PERPALLIDUS (C. B. Adams)

PLATE 18, FIGURES 4–6

1852. *Cyclostoma perpallidum* C. B. ADAMS, Ann. Lyc. Nat. Hist. New York, vol. 5, p. 81.
1852. *Cyclotus perpallidus* PFEIFFER, Monographia pneumonopomorum viventium, vol. 1, p. 29.
1857. *Cyclostoma perpallidus* CHITTY, Proc. Zool. Soc London, vol. 25, p. 157.
1898. *Neocyclotus (Plectocyclotus) perpallidus* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 9, p. 138, reprint.

Shell of medium size with sides sloping regularly to the spire, soiled white. The nucleus consists of 1.5 smooth, well-rounded turns. The postnuclear whorls are moderately well rounded, the first marked by feeble retractively curved axial riblets. Beginning with the second, fine wavy axial wrinkles make their appearance. These wrinkles branch and anastomose, enclosing spaces between them of varying length. They are a little weaker toward the summit than on the major portion of the whorls. Suture moderately well impressed on all of the turns. Periphery obscurely angulated and marked like the spire. Base very moderately rounded, almost flattened, marked by the continuation of the axial wrinkles, which here are retractively slanting and marked near the umbilicus by strong coarse ribs, which are wider than the spaces that separate them. The umbilical wall is marked by the continuation of these ribs and fine incremental lines. There is only the merest indication of angulation at the outer edge of the umbilicus. Aperture subcircular, decidedly protracted into a claw at the posterior angle, having the outer lip thin, inner somewhat thickened. Operculum?

Adams' type, here figured, has 5 whorls and measures: Height, 13.0 mm.; greater diameter, 19.4 mm.; lesser diameter, 15.4 mm.

Adams cites merely Jamaica, but Chitty (*loc. cit.*) states: "Near Moore Town, Portland." He says, "This shell was originally brought to me by a negro named Shelly, whom I could never, even by money excite to sufficient energy to collect more. * * * Operculum still wanting."

The species has not been rediscovered, and until the operculum has been found it will be impossible to place it properly. The peculiar sculpture, the sloping spire, and, above all, the flattish base, differentiate it from all the other known West Indian cyclophorids.

INCERTICYCLUS PERPLEXUS, new species

PLATE 18, FIGURES 19–21

Shell small, depressed-helicoid, covered with a golden-brown periostracum, at least the fragments left on our specimens would indicate that that is the case. The nucleus consists of 1.4 small, somewhat inflated, well-rounded, smooth turns. The first postnuclear whorl is strongly rounded and marked by very regular, rather distantly spaced, slender, well-raised axial riblets. On the succeeding turns the axial riblets are more closely approximated and reduced to incremental lines. In addition to these, the entire surface is marked by strong, very oblique, decidedly protractively slanting heavy ridges, which are separated by spaces about as wide as the ridges. These ridges at the periphery join the ridges on the base, which have a decidedly opposite slant, the two at their junction forming sharp arrowpoints. Base broadly, openly umbilicated, inflated, well rounded, and marked by the heavy rugations mentioned above. The umbilical wall bears coarse, more or less vertical, riblike incremental lines. Aperture circular; peristome simple, that of the outer lip thin; the inner lip thickened. Operculum unknown.

The type, U.S.N.M. No. 535988, was collected by Orcutt at Appleton, St. Elizabeth, Jamaica. It has 3.3 whorls remaining and measures: Height, 7.8 mm.; greater diameter, 14.9 mm.; lesser diameter, 11.3 mm.

U.S.N.M. No. 378448 contains two topotypes received from the same source. These are a little smaller than the type.

INCERTICYCLUS MARTINICENSIS (Shuttleworth)

1857. *Cyclostoma* (*Cyclotus*) *martinicense* SHUTTLEWORTH, Journ. Conchyl., vol. 5, p. 267.

Shell broadly umbilicated, lenticular, thin, finely striated, with dense fine spiral grooves, pale olive-brown, shining; spire little elevated. Apex rather obtuse; suture deep; 4–4½ convex, rapidly increasing whorls, the last scarcely descending; aperture hardly oblique, circular; peristome continous, acute. Operculum calcareous, scarcely convex on the outside, with ten volutions, depressed and expanded at the edge. Height, 8 mm.; greater diameter, 14 mm.; lesser diameter, 11.5 mm. Aperture 6 mm., broad and high.

Shuttleworth states that he had received two specimens of this from Petit from the Island of Martinique. I have not seen it and am unable to place it in any of the groups here listed.

INCERTICYCLUS CINEREUS (Drouet)

Plate 18, Figure 25

1859. *Cyclophorus cinereus* Drouet, Essai sur les mollusques terrestres et fluviatiles de la Guyane française, p. 90, pl. 3, figs. 37–38.

The following is a translation of Drouet's description:

Shell small, umbilicated, subturbinate, thin, scarcely translucent, finely striate, ashy; whorls 4, convex, apex obtuse; aperture angulatedly circular, peristome simple, acute. Operculum immersed, concolor, normal. Height, 4 mm.; greater diameter, 4.5 mm.; diameter of aperture 2 mm. * * * This Cyclophorid by its general form, size, and coloration resembles our *Valvata piscinalis* Müll. It has no decided characters except its small size, subturbinate form and ashy color, and especially the fine regular striations with which its shell is adorned.

The figures emphasizes the axial lirations.

There is no material in the collection of the United States National Museum that helps us understand this species. The fact that Drouet describes *Cyclophorus liratus* and *C. acutiliratus* immediately before his *C. cinereus* and says here that the operculum is normal, leads one to believe that he was dealing with an amphicyclotid. We know of none in the West Indies with axial ribs. I therefore include this species in sedis incertae. It was described from the Island of Martinique.

PART 3.—THE CYCLOPHORID MOLLUSKS OF THE MAINLAND OF AMERICA

By PAUL BARTSCH and JOSEPH P. E. MORRISON

Family CYCLOPHORIDAE Gray

The family Cyclophoridae is defined on p. 3.

The mainland cyclophorids range from Mexico to and over South America. They belong to four subfamilies, which the following key will help to differentiate:

KEY TO THE SUBFAMILIES OF CYCLOPHORIDAE ON THE MAINLAND OF AMERICA

Shell elongate-turrited	Megalomastominae
Shell not elongate-turrited.	
Shell pupoid	Diplommatininae
Shell not pupoid but planorboid or helicoid.	
Operculum chondroid	Amphicyclotinae
Operculum calcified	Aperostominae

Subfamily MEGALOMASTOMINAE Torre and Bartsch

For definition of the subfamily, refer to p. 3.

Genus TOMOCYCLUS Crosse and Fischer

1872. *Tomocyclus* CROSSE and FISCHER, Journ. Conchyl., vol. 20, p. 76.

Shells with elongated-turrited spire. Aperture circular, peristome double; the inner more or less exserted; the outer broadly flaringly expanded, with a slit terminating in a more or less circular perforation in the parietal wall below the edge of the peristome. Operculum with central nucleus, bearing a broadly expanded spiral lamella, which is reflected to parallel the basal chondroid plate. The outer edge of the lamella may be appressed to the succeeding turn, or fringes of its outer ragged edge may be free; in reality the entire lamella is free, and its appressed position is responsible for its appearing adnate.

Type: *Tomocyclus gealei* Crosse and Fischer.

T. simulacrum (Morelet) yields the following data: Radula formula: 3:3:3:3. Jaws with central projection. Penis on right side of neck traversed by a groove only.

The radula of *T. gealei* has the formula 3 : 3 : 3 : 3. According to Crosse and Fischer the jaw has a median projection, the verge is long and is on the side of the neck behind the tentacles, tapering gradually and bearing a seminal groove. There is no terminal appendage.

KEY TO THE SPECIES OF TOMOCYCLUS

- Axial sculpture consisting of slender ribs________________________________ gealei
- Axial sculpture not consisting of slender ribs but of fine incremental lines.
  - Outer peristome narrow__________________________________ guatemalensis
  - Outer peristome not narrow.
    - Siphon strongly developed________________________________ siphonis
    - Siphon not strongly developed.
      - Whorls strongly rounded____________________________ constrictus
      - Whorls not strongly rounded.
        - Shell large, height more than 35 mm_____________ simulacrum
        - Shell smaller, length less than 27 mm____________ copanensis

TOMOCYCLUS GEALEI Crosse and Fischer

Plate 19, Figure 1

1872. *Tomocyclus gealei* Crosse and Fischer, Journ. Conchyl., vol. 20, p. 77.
1886. *Tomocyclus gealei* Fischer and Crosse, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, pp. 118–120, pl. 40, figs. 1–3.
1890. *Megalomastoma* (*Tomocyclus*) *gealei* von Martens, Biologia Centrali-Americana, p. 10.

Shell very large, very elongate-turrited, covered by a pale yellowish-brown periostracum, which shows a few axial streaks of darker brown. Peristome bluish white, which is also the color of the interior of the aperture. The early whorls are decollated in all our specimens; those remaining are appressed at the summit, well rounded, and marked by somewhat sinuous, retractively curved axial riblets, which are about as wide as the spaces that separate them. In addition to this the whorls are marked by very closely spaced spiral striations. Suture strongly impressed. Periphery well rounded. Base moderately long with a strong, heavy, spiral keel bounding the outer edge of the umbilicus, which is open. Aperture circular; peristome double, the inner slightly exserted; the outer broadly flaringly expanded, with a slit in the parietal wall, which at some little distance behind the edge of the peristome develops into a perforation, the perforation being arched over by the two sides of the peristome, which almost form a siphon. Operculum typically tomocyclid.

The specimen described and figured, U.S.N.M. No. 321034, bears the label "Central America." It has 7 whorls remaining and measures: Height, 40.7 mm.; greater diameter, 17.8 mm.; lesser diameter, 11.9 mm. Height of aperture, 14.1 mm. externally, 7.9 mm. internally; diameter, 13.2 mm. externally, 7.7 mm. internally.

The United States National Museum collections contain the following specimens: U.S.N.M. No. 32069, 3 from Guatemala; U.S.N.M. No. 251126, 1 collected by O. F. Cook at Alta Vera Paz, Guatemala; U.S.N.M. No. 321031, 2 collected by S. Smith in Guatemala; U.S.N.M. No. 57333, 3 received from Bland, collected in Guatemala; U.S.N.M. No. 104444, 1 from Alta Vera Paz, Guatemala; U.S.N.M. No. 316386, 2 from Guatemala; U.S.N.M. No. 321033, 1 collected by Sallé, labeled "Mexico."

In size this species resembles *T. simulacrum*, from which it is easily distinguished by its rather strong axial ribs, which are absent in *simulacrum*.

TOMOCYCLUS GUATEMALENSIS (Pfeiffer)

Plate 19, Figure 4

1851. *Cyclostoma guatemalense* Pfeiffer, Proc. Zool. Soc. London, 1851, p. 245.

1852. *Megalomastoma guatemalense* Pfeiffer, Monographia pneumonopomorum viventium, vol. 1, p. 132.

1853. *Cyclostoma guatemalense* Pfeiffer, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 267, pl. 36, figs. 13, 14.

1872. *Tomocyclus guatemalense* Crosse and Fischer, Journ. Conchyl., vol. 20, p. 76.

1878. *Megalomastoma guatemalense* Reeve, Conchologia iconica, vol. 20, pl. 8, fig. 73.

1886. *Tomocyclus guatemalensis* Fischer and Crosse, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, p. 124, pl. 40, fig. 11.

We have not seen specimens of this species and copy Pfeiffer's figures and translate his description as given in Martini-Chemnitz.

Shell perforate, elongate, rather thick shelled, moderately truncated above, axially finely striate, white beneath a greenish-brown periostracum. Spire with a somewhat convex outline, gradually tapering. Whorls 6, slightly arched, the last shorter, descending anteriorly, and somewhat solute, compressed about the narrow open umbilicus but not keeled. Aperture parallel with the axis, almost circular. Peristome free, white, double, the inner complete, and only slightly produced; the outer expanded at right angles to the aperture, excised over the perforation. Length, 24 mm.; diameter, 8 mm.

Pfeiffer's figure has 5.8 whorls remaining and measures: Height, 23.2 mm.; greater diameter, 11.6 mm.; lesser diameter, 8.2 mm. Height of aperture externally, 8.2 mm., internally, 6.1 mm.; diameter externally, 6.7 mm., internally, 5.1 mm.

Habitat: Alta Vera Paz, Guatemala.

These figures show a finely ribbed shell with a much more narrowly expanded outer peristome than in any of the other species.

TOMOCYCLUS SIPHONIS, new species

PLATE 19, FIGURE 5

Shell of medium size, olivaceous with a chestnut tinge; peristome bluish white, which is also the color of the interior. Early whorls decollated in all our specimens; those remaining well rounded, appressed at the summit, which is slightly denticulated and marked by lines of growth, which do not form riblets. There is also an indication of microscopic spiral striations. Suture strongly constricted. Periphery well rounded. Base with a weak carina at the outer edge of the umbilicus, which disappears on the last quarter of the last turn. Aperture circular; peristome double, the inner moderately exserted; the outer broadly flaringly expanded and somewhat wavy with a strong sinus on the middle of the parietal wall, which connects with a round opening, over which the two sides of the reflected outer peristome form a pseudosiphon. Operculum typically tomocyclid.

The type, U.S.N.M. No. 162511, was collected by von Ihering at Alta Vera Paz, Guatemala. It has 5 whorls remaining and measures: Height, 31 mm.; greater diameter, 14.6 mm.; lesser diameter, 9.7 mm. Height of aperture, 12.9 mm. externally, 5.9 mm. internally; diameter, 12.2 mm. externally, 5.8 mm. internally.

This differs from *T. constrictus* in having the pseudosiphon much more strongly developed and the basal carina much weaker; it is also paler in coloration.

TOMOCYCLUS CONSTRICTUS, new species

PLATE 19, FIGURE 2

Shell of medium size, elongate-turrited, covered with a chestnut-brown periostracum. Early whorls decollated in all our specimens; those remaining strongly rounded, slightly denticulated at the summit, and marked by feeble obsolete axial riblets corresponding to the denticulations at the summit; these, however, evanesce on the major portion of the base. In addition to this, the whorls are marked by fine spiral striations. Suture strongly constricted. Periphery well rounded. Base slightly produced, bearing a very strong keel at the outer limit of the umbilicus. Aperture circular; peristome double, the inner moderately exserted; the outer broadly, wavily, flaringly expanded, with a notch in the parietal wall which connects with the round opening. The two sides of the peristome arch over to partly cover the pseudosiphon. Operculum typically tomocyclid.

The type, U.S.N.M. No. 162315, was collected by Godman at Coban, northern Guatemala. It has 5.3 whorls remaining and measures: Height, 32.8 mm.; greater diameter, 15.2 mm.; lesser diameter, 10.4 mm. Height of aperture, 12.6 mm. externally, 6.5 mm. internally; diameter, 12.2 mm. externally, 6.3 mm. internally.

The United States National Museum collections contain also the following specimens:

U.S.N.M. No. 516028, a topotype; U.S.N.M. No. 250693, 4 specimens received from Rolle, collected at Finca de Providencia, Guatemala; U.S.N.M. No. 321030, 1 specimen received from Sowerby and Fulton, labeled "Guatemala."

This species resembles *T. siphonis*, but differs from it in its weaker siphonal development and in having the whorls much more strongly rounded and the basal keel much stronger.

TOMOCYCLUS SIMULACRUM (Morelet)

PLATE 19, FIGURE 6

1849. *Cyclostoma simulacrum* MORELET, Testacea novissima insulae Cubanae et Americae centralis, p. 22.

1852. *Megalomastoma simulacrum* PFEIFFER, Monographia pneumonopomorum viventium, vol. 1, p. 131.

1853. *Cyclostoma simulacrum* PFEIFFER, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 267, pl. 36, figs. 11, 12.

1864. *Megalomastoma simulacrum* SOWERBY, Thesaurus conchyliorum, vol. 3, ul. 263, figs. 3, 4.

1872. *Tomocyclus simulacrum* CROSSE and FISCHER, Journ. Conchyl., vol. 20, p. 76.

1878. *Tomocyclus simulacrum* KOBELT, Illustrirtes Conchylienbuch, p. 195, pl. 61, fig. 22.

1878. *Megalomastoma simulacrum* REEVE, Conchologia iconica, vol. 20, p. 8, fig. 72.

1883. *Megalomastoma simulacrum* TRYON, Manual Conchology, vol. 2, p. 282, pl. 75, fig. 61.

1886. *Tomocyclus simulacrum* CROSSE and FISCHER, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, pp. 121–124, pl. 40, figs. 9, 9a; pl. 44, figs. 1, 1a.

Shell large, covered with a chocolate-brown periostracum, which grows paler toward the tip. Peristome yellowish bluish white, which is also the color of the interior of the aperture. Early whorls decollated in all our specimens; those remaining moderately well rounded, appressed at the summit, and marked by rather irregular incremental lines. Suture strongly constricted. Periphery well rounded. Base with a moderately strong keel marking the outer limit of the umbilicus. This disappears on the last quarter of the last turn. Aperture circular; peristome double, the inner slightly exserted; the outer broadly, sinuously flaringly expanded. A slit on the middle of the parietal wall with the two sides reflected over it partly covers a round puncture a little behind the edge of the peristome.

The specimen figured, U.S.N.M. No. 203656, was received from Bland and comes from Guatemala. It has 5.7 whorls remaining and measures: Height, 38 mm.; greater diameter, 16.6 mm.; lesser diameter, 11.1 mm. Height of aperture externally, 13.4 mm., internally, 6.8 mm.; diameter externally, 13.4 mm., internally, 6.7 mm.

The following additional specimens are in the National Museum Collection: No. 321006, from the Redfield Collection; No. 365365, 1 collected by A. A. Hinkley at Chama, Alta Vera Paz, Guatemala; No. 32070, 2 collected by Sarg between Tactic and Tamaju, Alta Vera Paz, Guatemala.

This species is the largest of the smooth-whorled forms. In size it resembles *T. gealei* Crosse and Fischer, and in sculpture it agrees with the other species.

TOMOCYCLUS COPANENSIS (Sowerby)

PLATE 19, FIGURE 3

1850 *Cyclostoma copanense* SOWERBY, Thesaurus conchyliorum, vol. 1, Suppl. p. 165*, pl. 31B, figs. 310, 311.

1886. *Tomocyclus similacrum copanensis* FISCHER and CROSSE, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, p. 121, pl. 40, figs. 4, 5, 7, 8, 10.

1886. *Tomocyclus simulacrum* var. d FISCHER and CROSSE, *ibid.*, p. 121, pl. 40, fig. 6.

1890. *Megalomastoma* (*Tomocyclus*) *simulacrum minus* VON MARTENS, Biologia Centrali-Americana, p. 10.

1890. *Meglomastoma* (*Tomocyclus*) *simulacrum gracilius* VON MARTENS, *idem.*

Shell small, chestnut-brown. The early whorls decollated in all our specimens; the latter well rounded, appressed at the summit, and marked by lines of growth and indistinct spiral striations. Suture well constricted. Periphery well rounded. Base moderately long, with a strong keel marking the outer edge of the umbilicus, which disappears on the last quarter of the last turn. Aperture circular; peristome double, the inner slightly exserted; the outer flaringly, somewhat wavily expanded, with a slit on the parietal wall, which communicates with the circular perforation a little behind the slit. The two edges of the peristome are bent over to form a siphon.

The specimen described and figured is one of two, U.S.N.M. No. 515763, collected by Godman at Coban, Guatemala. These differ materially in size, so we are giving the dimensions of both. The specimen figured has 5.2 whorls remaining and measures: Height, 26 mm.; greater diameter, 12.6 mm.; lesser diameter, 8.7 mm. Height of aperture externally, 9.5 mm., internally, 5.8 mm.; diameter externally, 10 mm., internally, 5.5 mm. The smaller specimen has 5.5 whorls remaining and measures: Height, 22 mm.; greater diameter, 10.8 mm.; lesser diameter, 7 mm. Height of aperture externally, 8.3 mm., internally, 5 mm.; diameter externally, 8 mm., internally, 5 mm. The U. S. National Museum collections contain 3 additional lots: No. 316385, 3 specimens labeled "Guatemala"; No. 515764, 1 specimen received from Sowerby & Fulton labeled "Guatemala"; No. 321005, 1 specimen from Alta Vera Paz, Guatemala, collected by Cuming.

There appears to have been considerable misunderstanding about this species. We have lumped v. Martens' *Megalomastoma* (*Tomocyclus*) *simulacrum minus* and his *M.* (*T.*) *simulacrum gracilius* under this name, which we feel justified in doing from the specimens before us. The small size will readily differentiate this from the other more or less smooth forms.

Subfamily DIPLOMMATININAE Kobelt

This subfamily embraces a dozen or more genera and some 400 species. Its distribution extends from Siberia south through India, and in the west Pacific Island complex from Japan to eastern New Zealand. Only a single genus, *Adelopoma*, has been reported from America.

Genus ADELOPOMA Doering

1884. *Adelopoma* DOERING, Bol. Acad. Nac. Cienc. Córdoba, vol. 7, p. 457.

1898. *Eupalaina* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 30, p. 131, in part.

1898. *Cylindropalaina* KOBELT and MÖLLENDORFF, *ibid.*, p. 133, in part.

Small pupiform, sinistral or dextral shells, white, thin. Nuclear whorls smooth; postnuclear whorls ornamented with scalariform axial ribs; suture strongly constricted. Aperture circular, with a small denticle on the columellar wall; peristome double. Operculum thin, corneous, with 3 or 4 whorls whose outer edge is slightly upturned.

Type: *Adelopoma tucma* Doering.

Distribution: Costa Rica to Peru.

The radula formula cited by Doering is: 5:4:4:2 for *A. tucma*. Baker (Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 47, 1922) gives the radula for *A. occidentale* Baker from La Fria, Venezuela, as 7:5:5:5. This is our *A. bakeri.*

In 1863 Philippi described *Pupa limensis* (Malak. Blätter, vol. 14, p. 75), and this was later referred by Doering and Ancey to the genus *Adelopoma*, but Pilsbry has definitely shown that it belongs to the genus *Pupoides* in the Pupillidae.

ADELOPOMA TUCMA Doering

PLATE 40, FIGURE 1

1884. *Adelopoma tucma* DOERING, Bol. Acad. Nac. Cienc. Córdoba, vol. 7, p. 458, figs.

1902. *Adelopoma tucma* KOBELT, Das Tierreich, Cyclophoridae, p. 480.

We have not seen this species, but we give a translation of Doering's description and copy his figure.

Shell rimate, small, oblong-ovate, pupilliform, thin, white, crystalline, with attenuated apex, closely obliquely rib-striate; whorls 6, convex, the first 2 nuclear, smooth. The postnuclear whorls are elegantly, closely rib-striately sculptured; the last exceeds one-fourth the length of the shell. Suture profound, excavated; aperture circular, straight; peristome straight, continuous, reflectedly expanded. Length, 2 mm.; diameter, 1 mm. Diameter of aperture, 6 mm. Operculum small, concave, circular, with concentric and spiral striations, slightly yellowish.

Radula formula: 5 : 4 : 4 : 2.

The locality as given by Doering is Sierra de Tucuman, Argentina.

ADELOPOMA STOLLI (von Martens)

PLATE 40, FIGURES 2, 3

1890. *Diplommatina stolli* VON MARTENS, Biologia Centrali-Americana, p. 20, pl. 1, fig. 19.

1898. *Palaina* (*Eupalaina*) *stolli* KOBELT and MÖLLENDORFF, Nachrb. Deut. Malak. Ges., vol. 30, p. 133.

1902. *Adelopoma stolli* KOBELT, Das Tierreich, Cyclophoridae, p. 480.

We have not seen specimens of this species and therefore must give a translation of v. Martens' description and copy his figure:

Shell sinistral, imperforate, ovate-conic, with 16 strong ribs on the penultimate whorl, white; whorls 6, convex, the first 2 smooth, yellowish, the penultimate the largest, the last a little narrower, rounded and thin; aperture subvertical, circular; peristome continuous, thickened, expanded, white. Length, 2.5 mm.; diameter, 1 mm. Aperture 0.75 mm.

Habitat: Northwest Guatemala in the District of Cholhuitz, on the slope of the Volcano Santa Maria at the plantation Helvetia, where 2 specimens were found by O. Stoll on the ground in second growth woods.

Comparing the specimens with *Adelopoma occidentale* from Trinidad, the riblets in *A. stolli* are very much stronger and less numerous.

Hinkley (Nautilus, vol. 21, p. 78, 1907), reports this species from Tampico, where a single specimen was found. We have seen this specimen, but unfortunately it was so badly fractured that we were unable to make any comparison. Judging from the distribution, we rather doubt its identity. It is possible that this represents a distinct form.

ADELOPOMA BAKERI, new species

PLATE 40, FIGURE 5

1923. *Adelopoma occidentale* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, pp. 46–48, fig. 21 (radula).

Shell minute, sinistral, pupoid, white. The nucleus consists of 1.5 inflated mammillated turns, which are smooth. The postnuclear whorls are inflated, strongly rounded, and marked by distantly spaced, slender, scalariform, protractively curved axial ribs, of which 33 are present on the first, 29 on the second, 26 on the third and fourth, and 12 on the remaining 0.4 of a turn, in the type. Suture very strongly constricted. Base well rounded, very narrowly umbilicated, marked by the continuation of the axial ribs. Aperture obliquely oval; peristome double, the inner expanded, thickened, exserted, and slightly reflected, adnate to the preceding turn on the parietal wall. There is a feeble denticle in the middle of the columella. Outer peristome rather broadly flaringly expanded.

Radula formula: 7:5:5:5.

The type and 27 specimens, No. 140916, are in the collection of the Philadelphia Academy of Natural Sciences, collected by H. B. Baker at Quebrada, Venezuela. The type has almost 6 whorls and measures: Height, 2.3 mm.; diameter, 1.2 mm.

This species is distinguished from *A. occidentale* in having white nuclear whorls, and in being stouter, with a much more strongly developed peristome.

ADELOPOMA COSTARICENSE, new species

Plate 40, Figure 4

Shell minute, sinistral, thin, semitranslucent, alabaster white. Nuclear whorls 1.5, inflated, strongly rounded, smooth. Postnuclear whorls inflated, strongly rounded, and marked by low, lamellar, scalariform, decidedly protractively slanting axial ribs, of which 24 are present on the first three whorls and 12 on the last half turn. The spaces separating the axial ribs are 7 or 8 times as wide as the ribs, and are covered by exceedingly fine, microscopic, spiral striations. Suture very strongly constricted. Base inflated, well rounded, with a narrow umbilical chink, marked by the continuation of the sculpture described for the spire. Aperture broadly obliquely oval; peristome double, the inner strongly exserted and reflected; the outer moderately broadly expanded, adnate, and appressed to the preceding turn. Operculum typically adelopomid.

The type, U.S.N.M. No. 516034, comes from Santa Maria, Costa Rica, at an altitude of 1,550 meters. It has 6 whorls and measures: Height, 2.3 mm.; diameter, 1.2 mm. U.S.N.M. No. 516035 contains 9 topotypes.

This species is distinguished from *A. occidentale* (Guppy) by being a little slenderer and having fewer axial ribs; these, too, are less worn at the summit and near the periphery than on the middle, which is not true of *occidentale*.

ADELOPOMA OCCIDENTALE (Guppy)

PLATE 40, FIGURE 6

We have described this species from Trinidad (p. 52).

Specimens indistinguishable from it were obtained by the Bond Venezuelan Expedition of the Academy of Natural Sciences of Philadelphia in 1911, at Cariaquita, Venezuela. They are registered as A.N.S.P. No. 105193 and U.S.N.M. No. 536008.

Cariaquita is not far from the Island of Trinidad, and it is not surprising that the species should extend to this locality.

Subfamily AMPHICYCLOTINAE Kobelt and Möllendorff

For the characters of this subfamily, refer to p. 52.

KEY TO THE GENERA OF THE SUBFAMILY AMPHICYCLOTINAE

- Spiral sculpture strong.
  - Shell discoid ---- Buckleyia
  - Shell not discoid.
    - Shell helicoid.
      - Shell with a notch at base of columella ---- Lagocyclus
      - Shell without a notch at base of columella.
        - Shell with two spiral keels on umbilical wall ---- Filocyclus
        - Shell without spiral keels on umbilical wall ---- Calaperostoma
- Spiral sculpture absent or obsolete.
  - Peristome reflected ---- Cyrtotoma
  - Peristome not reflected.
    - Posterior angle of aperture with a strong keel ---- Barbacyclus
    - Posterior angle of aperture without a strong keel.
      - Shell smooth ---- Calacyclotus
      - Shell not smooth but with axial sculpture only.
        - Axial sculpture not vermiculated.
          - Axial sculpture vertical ---- Mexcyclotus
          - Axial sculpture retractive ---- Megacyclotus
        - Axial sculpture vermiculated ---- Amphicyclotus

Genus BUCKLEYIA Higgins

1872. *Buckleyia* HIGGINS, Proc. Zool. Soc. London, 1872, p. 86.
1873. *Bucklcya* MOUSSON, Malak. Blätter, vol. 21, p. 17.

Amphicyclotine shells of a discoid shape, having the upper and lower side almost identical in all features. Operculum with the edge of the outer turns upturned as flakelike elements.

Type: *Aperostoma* (*Buckleyia*) *montezumi* Higgins=*Buckleyia martinezi* (Hidalgo).

Distribution: Colombia and Ecuador.

KEY TO THE SPECIES OF BUCKLEYIA

- Spiral keels 2 ---- bicincta
- Spiral keels 4.
  - Spiral keels strong ---- martinezi
  - Spiral keels weak ---- bifasciata

BUCKLEYIA BICINCTA, new species

Plate 19, Figures 13–15

Shell disk shaped, concave on both the upper and lower surface, dark olive-green with whitish axial bands, which are rather irregular in outline and of varying width but of rather regular spacing. The nucleus consists of almost one turn, which is followed by a portion having spiral threads, and this in turn is succeeded by a part which has 2 strong keels at a considerable distance anterior and posterior to the periphery. The slightly rounded space between these two keels is marked by 22 slender spiral threads, as well as incremental lines. On the upper surface there is a moderately strong spiral thread almost median between the supraperipheral keel and the suture. There are 20 slender hairlines between this and the supraperipheral keel, and 18 between it and the suture on the upper surface. On the lower surface there is a similar arrangement, 22 spiral threads being present between the strong subperipheral keel and the median cord and 16 between it and the suture. Suture well impressed, showing the spiral keel on both the upper and lower surface. Aperture with the upper and lower lip evenly curved; the outer lip is less arched and rendered eared by the two spiral keels. The parietal lip corresponds in arching to the outer.

The type, U.S.N.M. No. 316063, comes from Ecuador without specific locality designation. It has 4.4 whorls and measures: Height, 5.2 mm., greater diameter, 16.5 mm.; lesser diameter, 12.8 mm.

The strong 2-keeled aspect of the shell readily differentiates this from the other two species.

BUCKLEYIA MARTINEZI (Hidalgo)

Plate 19, Figures 19–21

1866. *Cyclophorus martinczi* Hidalgo, Journ. Conchyl., vol. 14, p. 273, pl. 8, fig. 5.

1872. *Aperostoma* (*Buckleyia*) *montezumi* Higgins, Proc. Zool. Soc. London, 1872, p. 686, pl. 56, fig. 7.

1873. *Buckleya martinezi* Mousson, Malakoz. Blätter, vol. 21, p. 17.

Shell disk shaped, concave on both the upper and lower surface, sides olive-green with paler axial bands; these vary considerably in width and spacing. The nucleus consists of a fraction of a turn and is smooth. This is followed by a spirally lirate portion, which in turn is succeeded by a part bearing 4 strong keels, which are of about equal strength and spacing. Two of these are on each side of the periphery and the other two separated from them by a space as wide as the one that separates these two keels, one above and the other below on the base. The spaces between these keels are concave and marked by several fine spiral threads and rather strong threadlike incremental lines. Between the suture and the first strong keel, a little nearer to the latter, there is another spiral thread on the dorsal surface, which is materially stronger than the fine spiral hairlines covering the rest of the whorl in this region. Of these fine spiral hairlines, 19 are present between the suture and the stronger thread and 17 between that and the first strong keel, in the specimen which we are figuring. On the ventral side there is also a median stronger thread corresponding to one on the upper side and between this and the suture 19 spiral hairlines are present, while the space between this and the first strong keel bears 15 spiral hairlines. The suture is strongly channeled on both the upper and the lower surface, and shows the spiral keel. Aperture circular; peristome simple, rendered fluted on the peripheral side. Operculum with central nucleus, many whorls with the outer edge of the later whorls upturned and projecting as flakelike elements.

The specimen described and figured, U.S.N.M. No. 420868, bears the locality label "Ecuador." It has 4.5 whorls and measures: Height, 7.5 mm.; greater diameter, 24.7 mm.; lesser diameter, 17.9 mm.

The four strong keels readily differentiate this from the other species here discussed.

BUCKLEYIA BIFASCIATA Mousson

PLATE 19, FIGURES 16–18

1873. *Buckleya bifiasciata* MOUSSON, Malak. Blätter, vol. 21, p. 17.
1875. *Buckleya bifasciata* PFEIFFER, Nov. Conch., vol. 4, p. 132, pl. 129, figs. 15–18.
1876. *Cyclophorus bifasciata* PFEIFFER, Monographia pneumonopomorum viventium, vol. 4, p. 122.
1897. *Buckleyia bifasciata* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 139.

Shell disk shaped, concave on both the upper and lower surface, of olivaceous ground color, marked with darker spiral zones of varying width. There are two broad paler bands at some little distance above and below the periphery, which are edged with darker zones, which consist of a series of interrupted elongated beadlike elements. The ground color is not uniform but has a marbled effect. The nuclear whorls consist of a smooth fraction of a turn followed by a portion bearing spiral hairlines and this in turn is succeeded by whorls that have 4 low rounded cords (not keels), the space between the two central ones being wider than that which separates the two adjacent to these. The central ones are equally distant from the periphery. Between the central ones 8 spiral threads are present, while between the two cords on the dorsal surface 5 spiral threads are present. The rest of the dorsal surface also bears spiral threads, of which 13 are present on the anterior half of the turns, while on the posterior half they are obsolete. On the ventral surface 7 fine spiral lines are present between the two cords and 12 on the anterior third of the rest of the whorls, while posterior to this the spiral sculpture is obsolete. Suture well impressed, showing the spiral cord. Aperture almost circular, slightly compressed dorsoventrally; peristome simple.

The specimen described and figured, U.S.N.M. No. 414156, was collected by H. Damel at Jerico, Antioquia, Colombia. It has 4.4 whorls and measures: Height, 7.5 mm.; greater diameter, 23 mm.; lesser diameter, 17 mm.

The weaker keels and the two strong color bands readily distinguish this species from *B. martinezi* (Hidalgo).

LAGOCYCLUS, new genus

Amphicyclotine shells of helicoid shape, with spiral striations or lirations. There is a notch in the peristome at the junction of the inner and basal lip, which becomes bridged over behind the peristome to form a conspicuous keel extending over all the whorls.

Type: *Lagocyclus crosseanus* (Hidalgo).

Distribution: Ecuador and Peru.

KEY TO THE SPECIES OF LAGOCYCLUS

- Strong spiral threads present on last whorl.
  - Subperipheral spiral threads present.
    - Spiral cords strong and regular ---------- antoni
    - Spiral cords weak and irregular ---------- haematommus
  - Subperipheral spiral threads absent ---------- crosseanus
- Strong spiral threads absent on last whorl.
  - Shell large, greater diameter 30.6 mm ---------- vasconesi
  - Shell smaller, greater diameter 21.0 mm ---------- bartletti

LAGOCYCLUS ANTONI (Cousin)

PLATE 20, FIGURES 6–8

1887. *Cyclophorus antonii* COUSIN, Bull. Soc. Zool. France, 1887, p. 85, pl. 4, fig. 4.

Shell rather small, covered with an olivaceous epidermis; when this is denuded the shell is soiled white on the last turn, the rest of the turns being rosy red. The nucleus consists of about one turn, which is smooth. The postnuclear whorls are marked by spiral cords of which 7 are present on the next to the last whorl and 8 on the last. On this there is also a finer thread between the heavier cords. In addition to this, the spire is marked by fine incremental lines. Suture moderately impressed. Periphery rounded. Base somewhat inflated, well rounded, and marked with 3 spiral cords equaling those of the spire immediately below the periphery, and a broad heavy keel marking the outer edge of the umbilicus. The arched space between this keel and the spiral cords is marked by obsolete spiral threads and coarse incremental lines. The spiral keel marking the outer edge of the umbilicus terminates in a notch at the peristome. The umbilicus is moderately broad and open to the tip. Its wall is marked by riblike incremental lines. Aperture somewhat oblique, almost circular; peristome simple, notched at the umbilical cord, the parietal wall covered with a moderately thick callus. Operculum unknown.

The specimen described and figured, U.S.N.M. No. 523512, was received from Sowerby & Fulton with the locality label "Ecuador." It has 5 whorls and measures: Height, 11 mm.; greater diameter, 18.7 mm.; lesser diameter, 13.9 mm.

The presence of spiral cords below the periphery readily distinguishes this species from *L. crosseanus* (Hidalgo).

LAGOCYCLUS HAEMATOMMA (Pfeiffer)

PLATE 20, FIGURES 1–3; PLATE 41, FIGURES 1–3

1862. *Cyclophorus haematomma* PFEIFFER, Proc. Zool. Soc. London, 1862, p. 276.
1863. *Cyclophorus haematomma* PFEIFFER, Nov. Conch., vol. 2, p. 217, pl. 57, figs. 12–14.
1897. *Amphicyclotus haematomma* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 139.
1912. *Amphicyclotus haematomma* KOBELT, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 924, pl. 138, figs. 10–12.

Shell helicoid, the early whorls bright brown, gradually fading to flesh color on the last turn. The nucleus consists of about one turn, which is well rounded and smooth. The first postnuclear whorl is also rounded and smooth, but the succeeding turns are well rounded and marked by spiral threads which vary considerably in size. Of these 7 are present on the third and fourth turns and 15 between the summit and the periphery on the last whorl. In addition to this the upper surface is marked by regular lines of growth which lend it a somewhat rough aspect. Suture moderately well impressed. Periphery well rounded. Base openly umbilicated, well rounded. The posterior third is marked by 4 strong spiral cords equaling those on the spire. Anterior to this there are microscopic spiral lines. There is a strong axial keel marking the outer edge of the umbilicus and slightly notching the aperture. The umbilical wall is marked by coarse lines of growth. Aperture oblique, subcircular, slightly auriculated at the posterior angle and notched at the basal cord. The peristome is slightly thickened on the inner lip.

The specimen described and figured, U.S.N.M. No. 536032, is marked "Ecuador," without specific locality. It has 5.4 whorls and measures: Height, 14.6 mm.; greater diameter, 20.5 mm.; lesser diameter, 16.4 mm. Height of aperture, 8.4 mm.; diameter, 8.5 mm.

L. haematomma is nearest related to *L. antoni* (Cousin), from which its finer, irregular spiral threads readily distinguish it.

LAGOCYCLUS CROSSEANUS (Hidalgo)

PLATE 20, FIGURES 9-11

1866. *Cyclophorus crosseanus* HIDALGO, Journ. Conchyl., vol. 14, p. 343, pl. 14, fig. 1.

1897. *Amphicyclotus crosseanus* KOBELT, Nachrb. deutschen malak. Ges., vol. 29, p. 139.

Shell of helicoid outline, covered with an olive-brown periostracum, white when this is removed, the basal portion being considerably darker than the spire. There is also a subperipheral chestnut-brown band present, which gradually fades toward the base. The nucleus consists of about one turn and is smooth. The postnuclear whorls are marked by spiral cords, of which 7 are present on the first and second, 8 on the third, and 12 on the last whorl between the summit and the periphery. These cords are a little less strong near the summit and stronger at the periphery. In addition to this the spire is marked by fine incremental lines. Suture strongly impressed. Periphery rendered angulated by a spiral cord. Base strongly rounded and marked by incremental lines only. There is a strong spiral keel at the outer edge of the umbilicus, which terminates in a notch at the peristome. Umbilicus moderately broadly openly umbilicated, its wall marked by almost riblike incremental lines. Aperture slightly oblique, circular; peristome simple, except the notch referred to above; parietal wall covered with a thin callus. Operculum corneous.

The specimen described and figured, U.S.N.M. No. 307412, was received from Sowerby and Fulton with the locality label "Ecuador." It has 5.2 whorls and measures: Height, 14.7 mm.; greater diameter, 22.5 mm.; lesser diameter, 17.0 mm.

This species is readily distinguished from *L. antoni* (Cousin) by lacking the spiral threads on the posterior base.

LAGOCYCLUS VASCONESI (Jousseaume)

PLATE 20, FIGURES 12-14

1897. *Cyclophorus vesconesi* JOUSSEAUME, Le Naturaliste, vol. 19, p. 250.

1898. *Cyclophorus vasconesi* JOUSSEAUME, Le Naturaliste, vol. 20, p. 81 (correction).

1899. *Amphicyclotus vesconesi* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 31, p. 136.

Shell of helicoid outline, covered with a chestnut-brown periostracum on the later turns; the early turns are reddish. It is a little paler on the underside than on the spire, and there is a light zone at the periphery bordered by a moderately broad dark band anterior to this. In addition there are obscure darker spiral lines on the upper whorls. The nucleus consists of about one smooth turn followed by whorls which bear 5 moderately strong spiral cords, which are of equal strength and spacing. The space between the first of these and the summit is about three times as wide as that separating the cords. On the last whorl, however, these spiral cords disappear. In addition to this the shell is marked by incremental lines. Suture moderately impressed. Periphery well rounded. Base moderately convex, marked by incremental lines only. A strong spiral cord limits the umbilicus at its outer edge, terminating in a notch at the peristome. The umbilicus is moderately broad, and its wall is marked by riblike incremental lines. Aperture slightly oblique, almost circular, produced into an angle at the posterior angle and notched at the base of the columella; peristome simple. Operculum unknown.

The specimen described and figured is one of three, U.S.N.M. No. 316107, bearing the locality label "Ecuador." It has 5.4 whorls and measures: Height, 22.5 mm.; greater diameter, 30.6 mm.; lesser diameter, 23.2 mm.

The large size readily distinguishes this species from *L. bartletti* (H. Adams).

LAGOCYCLUS BARTLETTI (H. Adams)

PLATE 20, FIGURES 4, 5

1870. *Aperostoma bartletti* H. ADAMS, Proc. Zool. Soc. London, 1870, p. 375, pl. 27, figs. 1, 1a.

1876. *Cyclotus bartletti* PFEIFFER, Monographia pneumonopomorum viventium, vol. 4, p. 35.

1897. *Neocyclotus* (*Neocyclotus*) *bartletti* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

1923. *Poteria* (*Neocyclotus*) *bartletti* H. B. BAKER, Occ. Pap., Mus. Zool. Univ. Michigan, No. 137, p. 32.

Shell depressed, broadly umbilicated, solid, closely plicately striate, yellowish white below the epidermis with a white band at the suture. Spire moderately elevated, suture impressed; whorls 6, moderately convex, the last with a prominent rib bounding the umbilicus; aperture oblique, subcircular, white within; peristome continuous, simple, subacute, angulatedly produced above, canaliculate at the columellar end. Operculum? Height, 14 mm.; greater diameter, 21 mm.; lesser diameter, 19 mm.

As we have not seen shells of this species, we copy Adams' figure and give a translation of his description.

It was collected by E. Bartlett in eastern Peru.

FILOCYCLUS, new genus

Shell helicoid, marked by feeble spiral grooves and quite strong incremental lines. The umbilical wall bears two strong spiral keels.

Type: *Filocyclus delphinulus* (Mousson).
Distribution: Northern South America.

FILOCYCLUS DELPHINULUS (Mousson)

Plate 19, Figures 10–12

1869. *Cyclophorus delphinulus* Mousson, Malak. Blätter, vol. 16, p. 180.
1875. *Cyclophorus delphinulus* Pfeiffer, Nov. Conch., vol. 4, p. 130, pl. 129, figs. 7–10.
1897. *Amphicyclotus delphinulus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 139.
1912. *Amphicyclotus delphinulus* Kobelt, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 915, pl. 134, figs. 1–4.

Shell broadly umbilicated, depressed-subdiscoid, spirally indistinctly sulcate, whitish, with two bands, one above and the other below the suture, which are dark brown and shining, and another chalky zone below the suture. Spire elevated, the tip rather prominent and horn colored. Suture subappressed, not deep. Whorls 5.5, increasing moderately in size, quite convex, flattened or subconcave at the suture; the last not descending, slightly concave above, then rounded, not angulated, with the two cords on the umbilical wall, the space between which is flattish and axially striate. Aperture scarcely oblique, subcircular, angulated above, showing the banding within. Peristome straight, acute, the margins approximated and joined by a thin callus; the outer lip arched and protracted, angulated at the posterior angle. The basal and columellar lip subsinuate, somewhat obtuse. Umbilicus broadly open, equaling one-half the diameter of the shell. Operculum corneous, thin, a little concave with closely spaced ragged whorls. Height, 12 mm.; greater diameter, 20 mm.; lesser diameter, 17 mm.

The above is a translation of Mousson's description, to which he adds: This species, for which we unfortunately have no definite locality, resembles the peculiar *C. cumingi* Sowerby, but it is smaller and has somewhat higher whorls but what peculiarly distinguishes it from that is the coloring and sculpture. The first consists of a soiled white base upon which 2 blackish brown shining zones are present, the upper of which is more distantly removed from the suture than is the case in *cumingi*. A chalk-white dull band is present immediately below the suture, and the rest of the upper white surface is dull. The entire surface is crossed by delicate spiral grooves which are scarcely discernible on the dark bands. The whorls curve slightly downward at the summit, toward the suture; and finally the umbilical wall shows two threadlike cords separated by a flat or slightly convex space. All the dull portion, particularly in the region of the umbilicus, is marked by strong incremental lines. *C.*

cumingi, on the other hand, is marked on the entire upper surface with equally strong spiral grooves which decrease in both directions from the periphery, and form no cords on the umbilical wall.

The shells described by Mousson were collected by Gustav Wallis in northern South America. He collected in parts of Colombia, Ecuador, and the Amazon region, according to Mousson's introductory remarks. We have seen nothing like it. The spiral cords in the umbilicus in a measure suggest *Lagocyclus*, which has only a single keel.

Genus CALAPEROSTOMA Pilsbry

1935. *Calaperostoma* Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, vol. 87, p. 4.

Amphicyclotine shells of helicoid outline, spirally banded, having spiral threads on spire and base, but not on the umbilical wall. Operculum corneous, with the outer edge of the whorls upturned, more or less regular, and marked by hairlike radial threads.

C. hidalgoi (Crosse) has the radula formula 3:3:3:2, and the jaw is without a median projection.

Type: *Calaperostoma cumingi* (Sowerby).

Distribution: Panama to Peru.

KEY TO THE SPECIES OF CALAPEROSTOMA[1]

- Spiral sculpture of last whorl strong.
  - Posterior angle of aperture decidedly auriculate.
    - Shell large, greater diameter 48 mm ---------- esmeraldense
    - Shell smaller, greater diameter 32 mm ---------- rosenbergi
  - Posterior angle of aperture not auriculated.
    - Spiral keels evenly distributed on spire.
      - Spiral keels on upper surface of last whorl 5 ------ guayaquilense
      - Spiral keels on upper surface of last whorl more than 10.
        - Shell very large, diameter more than 45 mm ---------- purum
        - Shell smaller, diameter less than 35 mm.
          - Suture impressed.
            - Greater diameter more than 25 mm. chanchapoyasense
            - Greater diameter less than 20 mm --------- bourcieri
          - Suture not impressed ---------- pittieri
    - Spiral keels not evenly distributed on spire.
      - Greater diameter more than 35 mm ---------- nigrofasciatum
      - Greater diameter less than 25 mm ---------- leai
- Spiral sculpture of last whorl not strong.
  - Umbilicus axially ribbed.
    - Greater diameter more than 40 mm ---------- cousini
    - Greater diameter less than 30 mm ---------- hidalgoi
  - Umbilicus not axially ribbed ---------- cumingi

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[1] *C. orbignyi* (Ancey) from Santa Cruz de la Sierra, Bolivia, is not included in this key because of insufficient data.

CALAPEROSTOMA ESMERALDENSE (Miller)

PLATE 20, FIGURE 18

1879. *Cyclophorus esmeraldensis* MILLER, Malak. Blätter, new ser. vol. 1, p. 142, pl. 15, fig. 3.
1897. *Amphicyclotus esmeraldensis* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 139.
1912. *Amphicyclotus esmeraldensis* KOBELT, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 920, pl. 138, fig. 2.

Shell broadly umbilicated, depressed, solid, white, reddish at the apex. Base pearly. Periostracum dark chestnut. Spire conic, little elevated. Whorls 5.5, or possibly 6, convex, the first 3.5 smooth, the following finely striated above and deeply impressedly sulcate at the periphery, with a broad smooth band at the suture. The base about the funnel-shaped umbilicus is axially plicate. The last whorl is subcompressed above and rounded on the base. Aperture oblique, not descending, transversely elliptical, broadly incised above (sinuous) with the outer lip produced and depressed; peristome simple, moderately thick and continuous. Operculum?

The type was collected by Wolf in the Province of Esmeraldas, Ecuador. It measures: Height, 22 mm.; greater diameter, 48 mm.; lesser diameter, 40 mm.

To the above, which is a translation of Miller's Latin description, Miller adds: The single specimen was discovered by Wolf in the drift of the Rio Cachabi. It had evidently been derived from the more elevated forests. The periostracum is only partly present on the upper side. It is therefore impossible to say what the color of the almost smooth band below the suture, which is marked only by lines of growth, may have been. The underside may have been paler. There was no operculum with it.

Miller's figure shows that the aperture is drawn out into a decided auricle at the posterior angle, in which respect it resembles most nearly *C. rosenbergi* (Da Costa).

We have not seen specimens referable to this species.

CALAPEROSTOMA ROSENBERGI (Da Costa)

PLATE 20, FIGURES 15–17

1898. *Cyclophorus rosenbergi* DA COSTA, Proc. Malac. Soc. London, vol. 3, p. 82, pl. 6, fig. 9.
1899. *Amphicyclotus rosenbergi* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 31, p. 136.
1912. *Amphicyclotus rosenbergi* KOBELT, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 924, pl. 138, figs. 13–15.

Shell broadly umbilicated, depressed-orbicular, burned chestnut above, yellowish chestnut below. Spire depressed-conic; apex smooth. Whorls 5, flattened near the suture, marked above by rounded plicate corrugations and rounded narrow spiral lirations. The last whorl is obtusely angulated at the periphery, smooth about the umbilicus. Aperture obliquely circular; peristome simple, profoundly sinuated at the suture. Operculum corneous with closely spaced whorls which are ragged at the periphery. Height, 20 mm.; greater diameter, 32 mm.; lesser diameter, 25 mm.

The type came from Cachabi, Ecuador.

The above is a translation of Da Costa's description. He adds: "A very interesting shell, distinguished from any other species of this genus, in that it has at the juncture of the aperture and the last whorl a deep sinuation, similar in character to that of *Pterocyclos;* the upper surface of the shell resembles that of *C. Vesconesi*, also from Ecuador, and described by M. Jousseaume in *Le Naturaliste* for November 1897 but it differs in the form of the umbilicus as well as in the sinuation which forms a peculiar feature in the new species. I have much pleasure in naming it after Mr. Rosenberg, its discoverer."

We have not seen specimens of this species. Da Costa's figure shows the aperture drawn out to form a decided auricle at the posterior angle, in which respect it resembles *C. esmeraldense* (Miller), from which its much smaller size will at once distinguish it.

CALAPEROSTOMA GUAYAQUILENSE (Sowerby)

Plate 20, Figure 19

1850. *Cyclostoma guayaquilense* Sowerby, Thesaurus conchyliorum, vol. 1, Suppl., p. 163*, pl. 31B, fig. 219.
1852. *Cyclophorus guayaquilensis* Pfeiffer, Monographia pneumonopomorum viventium, vol. 1, p. 95.
1861. *Cyclophorus guayaquilensis* Reeve, Conchologia iconica, vol. 13, sp. 79.
1897. *Amphicyclotus guayaquilensis* Kobelt and Möllendorff, Nachrb, deutschen malak. Ges., vol. 29, p. 139.
1912. *Amphicyclotus guayaquilensis* Kobelt, Martini-Chemnitz Conchlien Cabinet, vol. 1, sect. 19, p. 931, pl. 42, figs. 21–22.

"Shell depressedly subglobose, of a dull fulvous colour, with brown spiral lines; spire slightly acuminated, short, with a rather obtuse rufous apex; volutions four, rounded; suture distinct; aperture circular; peritreme thin; umbilicus large, smooth, only marked with extremely slender lines of growth. Guayaquil."

This is a small species with very strong spiral keels, of which Sowerby's figure shows 3 between the summit and periphery on the last whorl.

We have not seen specimens of it.

CALAPEROSTOMA PURUM (Forbes)

Plate 20, Figures 20, 21

1850. *Cyclostoma purum* Forbes, Proc. Zool. Soc. London, 1850, p. 56, pl. 9, fig. 9.

Shell orbicular, depressed, white, somewhat shining. The apex is slightly reflected, yellowish. Whorls 6, rounded, spirally sulcate. Sulci numerous, transversely striate. Aperture subcircular, oblique. Peritreme simple. Umbilicus very broad. Operculum?

Height, 17 mm.; greater diameter, 48 mm.

Forbes does not cite a locality with his description. In his introduction he says that the specimens he described were obtained during the surveying voyage of the *Harald* and *Pandora*, which covered various points between the coast of Ecuador and Vancouver Island, Galapagos, and Pitcairn Islands, and the Sandwich Islands.

The character of the shell would mark it as a South American species.

Its large size and depressed form readily distinguish it from the other members of the genus.

We have seen no specimens of this species and give Forbes' description and reproduce his figure.

CALAPEROSTOMA CHANCHAPOYASENSE (Da Costa)

Plate 21, Figures 4–6

1906. *Amphicyclotus chanchapoyasensis* Da Costa, Proc. Malac. Soc. London, vol. 7, p. 9, pl. 1, figs. 11–13.

1912. *Amphicyclotus chanchopoyasensis* Kobelt, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 916, pl. 134, figs. 16–18.

Shell depressed-helicoid, covered with a wood-brown periostracum. The spiral cords and the axial riblets at irregular distances are dark brown, thus giving to the surface of the shell a somewhat fenestrated appearance. The nucleus consists of about one smooth turn, which is followed by whorls that show low rounded raised spiral threads, of which 9 are present on the next to the last whorl and 12 between the summit and the suture on the last whorl. In addition to these spiral threads the whorls are marked by strong incremental lines, which are almost riblike in places, as well as by finer lines of growth. Suture strongly impressed, almost channeled. Periphery strongly rounded. Base inflated, strongly rounded, and marked by 12 spiral cords, which grow successively weaker from the periphery toward the umbilicus. The umbilical wall shows very feeble spiral threads. In addition to this the entire base and umbilical wall are marked by axial sculpture resembing that of the spire. Base very broadly openly umbilicated, showing all the whorls. Aperture oblique, circular, somewhat protracted at the posterior angle; peristome simple. Operculum with central nucleus having about 12 whorls, the upturned edge of which is raggedly fringed; the elements composing it are retractively striate.

U. S. N. M. No. 250743 contains 2 specimens, received from Herman Rolle, bearing the label "Chanchamayo, Peru." They have, respectively, 5.4 and 5.2 whorls, and measure: Height, 15.5 and 15.3 mm.; greater diameter, 27.0 and 24.0 mm.; lesser diameter, 21.3 and 18.3 mm., respectively.

This species appears nearest related to *C. bourcieri* (Pfeiffer), from which it can be readily distinguished by its much coarser sculpture and larger size.

CALAPEROSTOMA BOURCIERI (Pfeiffer)

PLATE 21, FIGURES 1–3

1852. *Cyclostoma (Cyclophorus) bourcieri* PFEIFFER, Proc. Zool. Soc. London, 1852, p. 151.

1852. *Cyclophorus bourcieri* PFEIFFER, Monographia pneumonopomorum viventium, vol. 1, p. 95.

1853. *Cyclostoma bourcieri* PFEIFFER, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 243, pl. 32, figs. 5–7.

1861. *Cyclophorus bourcieri* REEVE, Conchologia iconica, vol. 13, sp. 74.

1897. *Amphicyclotus bourcieri* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 139.

Shell small, depressed-helicoid, pale chestnut-brown, a little darker on the spiral threads and some of the axial ribs. The extreme apex has a faint reddish tinge. The nucleus consists of about one smooth turn; the succeeding turns are marked by low, rounded, rather broad spiral threads, of which 8 are present between the summit and the periphery. These spiral threads are less strong near the summit and gradually increase in strength toward the periphery. The axial sculpture consists of strong incremental lines, which assume almost the strength of riblets. Suture strongly impressed, almost channeled. Periphery well rounded. Base somewhat inflated, strongly rounded, and marked by the continuation of the incremental lines which here are a little less strong than on the spire and spiral threads which are quite feeble and absent on the umbilical wall. The umbilicus equals about one-third of the diameter of the shell. Aperture decidedly oblique, slightly protracted at the posterior angle; peristome simple, with a strong callus covering the parietal wall. Operculum with central nucleus, concave on the outside and convex on the inside, with a slender knob on the center of the inside. The outside shows about 10 whorls, the outer edge of which is slightly fringed.

U.S.N.M. No. 307411 contains 2 specimens from Quito, Ecuador. They are of about the same size; the one figured has 4.5 whorls and measures: Height, 11.9 mm.; greater diameter, 18.5 mm.; lesser diameter, 14.3 mm.

The impressed suture allies this species with *C. chanchapoyasense* (Da Costa), from which the smaller size and feebler sculpture will readily distinguish it.

CALAPEROSTOMA PITTIERI, new species

PLATE 21, FIGURES 7–9

Shell depressed-helicoid; color of periostracum? The denuded shell is white, the early whorls reddish. The nucleus consists of a little more than one smooth turn, the succeeding turns being marked by spiral cords, which are of almost equal strength and spacing. Of these, 16 are present between the summit and the suture on the last two turns. The spaces separating these cords are considerably wider than the cords. In addition to this the whorls are marked by fine, closely spaced, hairlike incremental lines. Suture rendered inconspicuous by the appressed summit. Periphery well rounded. Base somewhat inflated, strongly rounded and marked by 17 spiral cords equaling those on the spire. In addition to the spiral cords the base also shows the incremental lines equaling those on the spire. The umbilicus is broadly open and marked by riblike incremental lines and is free from spiral cords. Aperture decidedly oblique, subcircular, feebly auriculated at the posterior angle; peristome simple, that of the parietal wall covered with a thick callus. Operculum?

The type, U.S.N.M. No. 523513, was collected by H. Pittier in Panama. It has 6 whorls and measures: Height, 18.0 mm.; greater diameter, 32.3 mm.; lesser diameter, 24.4 mm.

U.S.N.M. No. 228670 contains 4 topotypes, the smallest of which measures: Height, 15.9 mm.; greater diameter, 27.3 and lesser diameter, 10.3 mm., and has 5.8 whorls. The largest has 6 whorls and measures: Height, 20.1 mm.; greater diameter, 33.8 mm.; lesser diameter, 26.3 mm.

This species differs from *C. bourcieri* (Pfeiffer) in being much larger and in having the summit of the whorls appressed.

CALAPEROSTOMA NIGROFASCIATUM (Miller)

PLATE 21, FIGURES 13–15

1879. *Cyclophorus nigrofasciatus* MILLER, Malak. Blätter, new ser. vol. 1, p. 142, pl. 7, fig. 5.

1897. *Amphicyclotus nigrofasciatus* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 139.

1912. *Amphicyclotus nigrofasciatus* KOBELT, Martini-Chemnitz Conchylien Cabinet. vol. 1, sect. 19, p. 921, pl. 138, figs. 3–5.

Shell rather large, helicoid. When decorticated white with the early whorls rose-red. In the specimen before us some of the periostracum remains and shows the broad dark chestnut brown band a little distance below the summit and a narrow thread covering the rib immediately below the periphery. A few indications near the aperture would lead us to believe that in perfect specimens all the spiral threads are darker than the ground color. The sculpture consists of strongly raised narrow spiral cords, which are not regularly distributed, but which are absent on the posterior half between the summit and the periphery. On the anterior half in the specimen figured 8 keels are present, which are not quite of equal spacing and are separated by deeply impressed concave grooves. The summit of the whorls is appressed; the suture therefore is inconspicuous. Periphery well rounded. Base inflated, well rounded and marked by 13 spiral keels of about the same strength and spacing as those on the spire. The last three near the edge of the umbilicus are very weak, while the spaces separating these keels are concave and, like those on the spire, marked by numerous hairlike incremental lines. The umbilicus is broad and its wall is marked by riblike axial incremental lines. Aperture broadly ovate, narrowly protracted at the posterior angle; peristome thin, rendered slightly fluted on the outer and basal lip by the ribs on the outside. Operculum corneous with central nucleus and with the lamella fimbriated at the outer margin.

The specimen described and figured, U.S.N.M. No. 523514, was collected by Oscar Haught on the road between Quevedo and Quito, Ecuador, at an altitude of about 500 meters. It has 6 whorls and measures: Height, 21.0 mm.; greater diameter, 36.8 mm.; lesser diameter, 27.3 mm.

It belongs to the group of *C. leai*, from which its much larger size will readily distinguish it.

CALAPEROSTOMA LEAI, new name

Plate 21, Figures 17–19

1834. *Cyclostoma striata* Lea, Trans. Amer. Philos. Soc., vol. 5, p. 196, pl. 19, fig. 77 (not *C. striatum* Sowerby, A catalogue of the shells contained in the collection of the . . . Earl of Tankerville, p. 41, 1825; or *C. striata* Quoy and Gaimard, Voyage de la corvette *l'Astrolabe* . . ., Zool. vol. 2, p. 186, 1832).

Shell depressed-helicoid of whitish ground color with spiral bands of brown. These dark bands consist of a broad zone at some little distance from the summit and the tops of the spiral cords. The early whorls are rose colored. The nucleus consists of about 2 smooth turns; the remaining whorls are marked by strong spiral cords excepting the white zone near the summit, which is free of them. The dark zone below this has 4 feeble cords, and anterior to this 6 additional much stronger cords are present. In addition to this the spire is marked by decidedly retractively curved, rather coarse incremental lines. Suture inconspicuous. Periphery rendered slightly angulated by the spiral keel. Base well rounded and marked by 14 subequal spiral keels, which are of about the same strength and spacing as those on the spire, and by the continuation of the incremental lines. Umbilicus moderately broad, marked by rather strong, riblike incremental lines. Aperture oblique, broadly oval; peristome simple, thin. Operculum corneous with central nucleus, the outer having the outer whorl upturned and fimbriated.

The specimen figured, U.S.N.M. No. 104651, is Lea's type of which he says:

"This shell was brought by Lt. Humphreys from South America." It has 5.5 whorls and measures: Height, 14.4 mm.; greater diameter, 22.4 mm.; lesser diameter, 17.3 mm.

U.S.N.M. No. 104652 contains three additional specimens collected by Cuming at Jumaco, western Colombia. U.S.N.M. No. 535747 contains another specimen without locality data.

In banding this species recalls *C. nigrofasciatum* (Miller), from which its small size will at once distinguish it.

CALAPEROSTOMA COUSINI (Jousseaume)

PLATE 21, FIGURE 16

1884. *Cyclophorus cousini* JOUSSEAUME, Bull. Soc. Zool. France, 1884, p. 173, pl. 4, fig. 13.

1897. *Amphicyclotus cousini* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak., Ges., vol. 29, p. 139.

1912. *Amphicyclotus cousini* KOBELT, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, part 3, p. 929, pl. 141, fig. 1.

Shell openly umbilicated, depressed-helicoid, rather heavy with traces of a chestnut brown periostracum, whitish. Upper whorls reddish, smooth; those succeeding marked with more or less spiral sculpture. The last has a broad shining white zone immediately below the suture, upon which most of the periostracal remnants are conserved, marked by spiral cords and axial riblets in the umbilicus. The shell has 6 whorls, of which the upper increase regularly in size; the last increases rapidly in size and is decurrent at the aperture. Aperture almost circular, somewhat compressed dorsally, forming a slight auricle at the posterior angle, shining, thin; peristome smooth, thick, slightly effuse, with a marked callus on the parietal wall. Height: 23 mm.; greater diameter, 43 mm.; lesser diameter, 35 mm.

Type locality: Near Pailon, Esmeraldas, Ecuador.

We have not seen this species and have given a translation of Jousseaume's description from Kobelt's citation (*loc. cit.*) and have copied Kobelt's figure.

The strong ribbing on the umbilical wall allies this with *C. hidalgoi* (Crosse), from which it is readily distinguished by its much larger size.

CALAPEROSTOMA HIDALGOI (Crosse)

Plate 21, Figures 10–12

1866. *Cyclophorus hidalgoi* Crosse, Journ. Conchyl., vol. 14, p. 354, pl. 14 fig. 4.
1897. *Amphicyclotus hidalgoi* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 139.

Shell of medium size, depressed-helicoid, covered with a chestnut-brown periostracum, a little paler on the early whorls. Nuclear whorls almost 2, smooth; the succeeding turns well rounded and marked by low, rounded spiral cords, of which 8 are present on the penultimate turn. These cords disappear on the last half of the last turn. They are a little narrower than the spaces that separate them, and the first is at a little distance below the summit. The axial sculpture consists of coarse incremental lines, which are almost rib-like. Those on the last whorl near the summit produce a series of feeble elongated nodules. Periphery well rounded. Base well rounded and marked by 8 weak, very low spiral cords, which are separated by mere impressed darker lines. The umbilicus is broad and its wall is marked by strong axial ribs. Aperture subcircular, oblique, slightly angulated at the posterior angle, bluish white within; peristome simple. Operculum corneous, with central nucleus, concave externally with a central papillus on the inside.

The specimen described and figured, U.S.N.M. No. 316134, is one from the Cuming collection from New Granada (Colombia). It has 5 whorls and measures: Height, 15.2 mm.; greater diameter, 25.9 mm.; lesser diameter, 19.4 mm.

This species resembles *C. cousini* (Jousseaume) by having the spiral sculpture on the upper surface evanescent on the last turn, and by having the umbilical wall axially ribbed; it differs from it in being much smaller.

CALAPEROSTOMA CUMINGI (Sowerby)

Plate 21, Figures 20–22

1832. *Cyclostoma cumingii* Sowerby, Proc. Zool. Soc. London, 1832, p. 32.
1842. *Cyclostoma cumingii* Reeve, Conchologia systematica, vol. 2, p. 99, pl. 85, fig. 19.
1843. *Cyclostoma cumingii* Sowerby, Thesaurus conchyliorum, p. 108, pl. 24, figs. 68, 69, 69*.
1847. *Cyclophorus cumingii* Pfeiffer, Zeitschr. Malak., vol. 4, p. 108
1848. *Cyclostoma cumingii* Pfeiffer, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 82, pl. 12, figs. 1–3.
1897. *Amphicyclotus cumingii* Kobelt and Möllendorff, Nachrb. deutschen Malak. Ges., vol. 29, p. 139.
1935. *Aperostoma* (*Calaperostoma*) *cumingii* Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, vol. 87, p. 4.

Shell very large, depressed-helicoid, ground color soiled white; the early turns rose-red. There is a very broad chestnut-brown zone covering the upper surface of the whorls, except for a white band at the summit and at the suture. The nucleus consists of almost 2 turns, which are smooth. The postnuclear whorls are marked by spiral threads, of which 7 are present on the anterior half of the whorls; on the posterior half there are indications of more, but they gradually evanesce toward the summit. On the last half of the last whorl they become completely obsolete. In addition to this there are microscopic spiral lirations. The incremental lines are decidedly oblique and moderately strong, and rather irregular on the last turn. Suture rendered inconspicuous by the appressed summit of the whorls. Periphery well rounded. Base inflated, strongly rounded, and marked by 13 spiral threads between the periphery and the edge of the umbilicus. These are decidedly stronger than those on spire and continue to the peristome. The base is broadly open and umbilicated and the umbilical wall is marked by incremental lines. Aperture broadly pear shaped, decidedly protracted at the posterior angle; peristome slightly reflected, simple. Operculum with central nucleus, slightly concave; the outer edge of the whorls is marked by lacinations, which are striated.

The specimen described and figured, U.S.N.M. No. 307420, comes from the Island of Tumaco, Colombia. It has 6.4 whorls and measures: Height, 27 mm.; greater diameter, 45.8 mm.; lesser diameter, 34.5 mm.

The huge size of this species readily distinguishes it from the other members that have the spiral cords obsolete on the last turn.

CALAPEROSTOMA ORBIGNYI (Ancey)

1892. *Cyclophorus orbignyi* Ancey, Journ. Conch., vol. 7, p. 94.

1897. *Amphicyclotus orbignyi* Kobelt and Möllendorff, Nachrb, deutschen malak. Ges., vol. 29, p. 139.

Shell depressed-discoid, broadly openly umbilicated, solid, soiled white below a deciduous fulvous periostracum, reddish on the early turns, rough or shining. Spire slightly elevated, the apex small, inconspicuous. Whorls 5, increasing regularly and rapidly in size, convex. Suture deep, the first three whorls smooth, the following ones acutely lirate, the threads being prominent and regular and well elevated at the periphery and on the base: the upper vary and they increase by intercalation. The last whorl is cylindric, and slightly descending near the aperture. The umbilical wall is smooth or slightly lirate. The umbilicus is one-fourth of the diameter of the shell or a little larger. Aperture oblique, circular, angulated above; peristome continuous, simple, appressed to the preceding turn. Operculum corneous, thin, concave externally with the whorls closely spaced.

The type was collected by Germain at Santa Cruz de la Sierra, Bolivia. It measures: Height, 16 mm.; greater diameter, 21 mm.

We have not seen this species. The above is a translation of Ancey's description, to which he adds: "Its prominent lirae, dull colour and deciduous epidermis are its most striking characters."

Although quite different, it belongs to the group of *C. cumingi* (Sowerby).

Genus CYRTOTOMA Mörch

1852. *Cyrtotoma* Mörch, Catalogus conchyliorum . . Comes de Yoldi, vol. 1, p. 40.

Amphicyclotine shells of helicoid outline; the sculpture consists of hairlike riblets; the outer peristome is expanded and reflected. The peristome on the parietal wall may be almost entire or vary from this to deeply notched. The operculum is corneous with central nucleus, and the outer edge of the whorls is upturned.

Type: *Cyrtotoma mexicanum* (Menke).

Distribution: Southeastern Mexico.

The radula formula of *C. walkeri* (H. B. Baker) is 3: 3: 3: 2, and the jaw has a median projection. The verge is situated on the right side of the neck and is traversed by a seminal groove only. It does not have a terminal appendage.

KEY TO THE SPECIES OF CYRTOTOMA

- Subsutural thread present.
  - Parietal notch conspicuous.
    - Parietal notch broad and U-shaped.
      - Peristome decidedly double------------------------ avus
      - Peristome not decidedly double------------------ salleanum
    - Parietal notch V-shaped------------------------- ignotum
  - Parietal notch obsolete--------------------------- fischeri
- Subsutural thread absent.
  - Parietal notch much deeper than wide------------------ palmeri
  - Parietal notch not deeper than wide.
    - Peristome strongly flaringly expanded-------------- mexicanum
    - Peristome not strongly flaringly expanded.
      - Greater diameter more than 20 mm--------------- goldmani
      - Greater diameter less than 16 mm----------------- walkeri

CYRTOTOMA AVUS, new species

Plate 22, Figures 22–24

Shell large, depressed helicoid, covered by a golden-brown periostracum, below which the last whorl of the shell is soiled white and the rest rosy tinged. The whorls are marked by coarse, retractively curved incremental lines; which on the last whorl almost form riblets. There is a spiral thread immediately below the rather deeply channeled suture. Periphery well rounded. Base strongly rounded, openly umbilicated, and marked by the incremental lines, which grow even stronger on the umbilical wall, which also shows some spiral lirations. Aperture circular, pale brown within; peristome expanded and reflected, forming an auricle at the posterior angle; the expanded portion is marked by concentric lines of growth, which give the impression of a double peristome. The notch on the parietal wall is rather shallow and openly U-shaped.

The type, U.S.N.M. No. 128285, was collected in damp woods at Motzorongo, Veracruz, Mexico. It has lost the extreme nuclear tip; the 4 whorls remaining measure: Height, 18.6 mm.; greater diameter, 32.8 mm.; lesser diameter, 23.8 mm.

The huge size and heavily thickened peristome readily distinguish this from the other Cyrototomas having a spiral thread below the suture.

CYRTOTOMA SALLEANUM (v. Martens)

Plate 22, Figures 19–21

1865. *Cyclophorus salleanus* v. Martens, Malak. Blätter, vol. 12, p. 151.

1880. *Habropoma salleanum* Fischer and Crosse, Mission scientifique au Mexique et dans l'Amérique Centrale, vol. 2, pt. 7, pl. 35, fig. 4.

1886. *Habropoma* (*Cyrtotoma*) *salleanum* Fischer and Crosse, *ibid.*, pp. 128, 133, pl. 38, fig. 1.

1890. *Cyclophorus* (*Cyrototoma*) *salleanus* von Martens, Biologia Centrali-Americana, p. 7.

1897. *Cyrtotoma salleanum* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 140.

1922. *Cyrtotoma mexicanum sallcanum* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 106, p. 42, pl. 16, figs. 8–12.

1928. *Aperostoma mexicanum salleanum* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 193, p. 51.

Shell rather large, depressed-helicoid, covered by a dark straw-colored periostracum. The extreme nuclear tip has a pale orange tint; the interior of the aperture is bluish white. Nuclear whorls about 2.5, smooth. Post-nuclear whorls well rounded, marked by slender, hairlike, retractively slanting, closely placed axial riblets. There is a feeble spiral cord at the summit. Suture narrowly channeled. Periphery well rounded. Base somewhat inflated, well rounded, and marked by the continuation of the axial riblets, which here are a little stronger than on the spire and still stronger than on the umbilical wall. The umbilicus is open and moderately broad. Aperture almost circular; peristome expanded and reflected, forming an auricle at the posterior angle. The notch on the parietal wall is U-shaped and rather deep.

The specimen described and figured, U.S.N.M. No. 211098, is one of two collected by C. R. Orcutt at Cordova, Veracruz, Mexico. It has 6 whorls and measures: Height, 18.7 mm.; greater diameter, 31.3 mm.; lesser diameter, 22 mm.

Two additional lots in the collection of the National Museum come from Cordova: one from Antigua; one from Orizaba. Six lots are labeled merely "Mexico," without specific locality.

There is considerable variation in the size of this species. The smallest specimen, U.S.N.M. No. 331900, has 6 whorls and measures: Height, 14 mm.; greater diameter, 21.3 mm.; lesser diameter, 15.7 mm. This is said to have been collected by Cuming; we have no locality label with it beyond that of Mexico.

The deep notch and lesser size easily distinguish this species from *C. avus*.

CYRTOTOMA IGNOTUM, new species

Plate 22, Figures 16–18

Shell helicoid, with rather elevated spire, covered with a pale straw-colored periostracum. Interior of peristome bluish white. Nuclear whorls 1.5, small, well rounded, smooth. Postnuclear whorls somewhat inflated, strongly rounded and marked by retractively slanting, hairlike axial riblets. The spaces separating these are two or three times as wide as the riblets. Suture deeply impressed by a feeble spiral thread on the summit of the whorl. Periphery well rounded. Base somewhat inflated, strongly rounded, marked by the continuation of the axial ribs, which pass over the umbilical wall, where they become a little stronger. Umbilicus broad, open. Aperture broadly oval, the long axis being between the notch and the junction of the basal and outer lip; peristome expanded and reflected, forming a slight auricle at the posterior angle. The callus on the parietal wall bears a deep V-shaped notch. Operculum typically cyrtotomid.

The type, U.S.N.M. No. 523515, bears the label "Mexico," without specific locality. It has 6 whorls and measures: Height, 17.5 mm.; greater diameter, 26.7 mm.; lesser diameter, 19 mm.

U.S.N.M. No. 15068 contains another specimen from the same source, which is a little smaller and has 5.6 whorls and measures: Height, 13.7 mm.; greater diameter, 22 mm.; lesser diameter, 15.3 mm.

This species, while resembling *C. salleanum* (von Martens), can readily be distinguished from it by its more elevated spire and by the deep V-shaped instead of U-shaped sinus.

CYRTOTOMA FISCHERI, new species

Plate 22, Figures 13–15

1880. *Habropoma (Cyrtotoma) mexicanum* Fischer and Crosse, Mission scientifique au Mexique et daus l'Amérique centrale, vol. 2, pl. 35, fig. 5.

1886. *Habropoma mexicanum* Fischer and Crosse, *ibid.*, p. 130, in part.

Shell moderately large, reddish orange colored except the last whorl, which is slightly paler; interior of aperture buff; peristome a little paler. The nucleus consists of about 2.5 well-rounded, smooth turns, forming a small apex. The postnuclear whorls are well rounded with a broad cord at the summit and an impressed area immediately anterior to this. The postnuclear whorls are marked by rather strong, retractively curved, axial riblets which are about as wide as the spaces that separate them. Suture strongly impressed. Periphery well rounded. Base openly umbilicated, well rounded and marked by the continuation of the axial riblets which here are much weaker than on the spire. They are again slightly stronger on the umbilical wall. Aperture almost circular, slightly effuse at the junction of the basal and outer lip; peristome thickened, expanded, and reflected and marked by concentric lines of growth. The parietal wall has an obsolete lunate notch. Operculum typically cyrtotomid.

The type, U.S.N.M. No. 515789, was collected by Dr. H. B. Baker at Hacienda Cuatotolapam, Veracruz, Mexico. It has 5.4 whorls and measures: Height, 17.0 mm.; greater diameter, 23.0 mm.; lesser diameter, 16.8 mm. Height of aperture, 10.0 mm.; diameter, 11.0 mm.

U.S.N.M. No. 515790 contains a paratype from the same source. U.S.N.M. No. 25011 contains 2 specimens merely labeled "Mexico," which are referable here.

This species can be differentiated from the other forms having a subsutural thread by the obsolete notch on the parietal wall.

CYRTOTOMA PALMERI, new species

Plate 22, Figures 1–3

Shell depressed-helicoid; the type is soiled white, having lost its periostracum. Nuclear whorls about 2, well rounded, smooth, forming a moderately small elevated apex. The postnuclear whorls are inflated, strongly rounded, and marked by retractively slanting axial riblets, which are about as wide as the spaces that separate them. These riblets gain in strength as the whorls increase in size. Suture strongly impressed. The last whorl solute for about one-tenth of a turn except the auricle at the posterior angle, which is adnate to the preceding whorl. Behind this there is a deep broad open space in the suture. Periphery well rounded. Base broadly openly umbilicated, marked by the continuation of the ribs, which are here somewhat wavy. The umbilicus is broad, and its wall is marked by axial ribs, but here they are weaker than on the base. Aperture broadly oval, with the long axis extending from the parietal wall to the junction of the basal and outer lip. Peristome very moderately expanded and reflected, adnate to the preceding turn at the posterior angle. There is a very profound sinus, which begins as a narrow slit near the edge of the peristome then widens into a circular opening at the posterior termination. The edge of this bulges inward and is somewhat thickened.

The type, U.S.N.M. No. 198079 was collected by Dr. Edward Palmer at Gomez Farias, Tamaulipas, Mexico. It has 5.6 whorls and measures: Height, 14.4 mm.; greater diameter, 25.2 mm.; lesser diameter, 18.5 mm.

The soluteness of the whorl a little distance behind the edge of the peristome and the exceedingly deeply incised tear-shaped sinus on the parietal wall readily distinguish this species from the other members of the genus that do not have a thread in the suture.

CYRTOTOMA MEXICANUM (Menke)

PLATE 22, FIGURES 4–6

1830. *Cyclostoma mexicanum* MENKE, Synopsis methodica molluscorum, p. 133.
1847. *Aperostoma mexicanum* TROSCHEL, Zeitschr. Malak., vol. 4, p. 44.
1850. *Cyclotus mexicanus* GRAY, Nomenclature of molluscous animals and shells in the collection of the British Museum, pt. 1, p. 9.
1852. *Cyrtotoma mexicanum* MÖRCH, Catalogus conchyliorum . . . Comes de Yoldi, vol. 1, p. 40.
1864. *Cyclotus mexicanus* BINNEY, Bibliography of North American conchology, pt. 2, p. 122.
1878. *Aperostoma (Cyrtotoma) mexicanum* NEVILL, Hand-list of Mollusca in the Indian Museum, vol. 1, p. 258.
1886. *Habropoma mexicanum* FISCHER and CROSSE, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, p. 130, in part.
1890. *Cyclophorus (Cyrtotoma) mexicanus* VON MARTENS, Biologia Centrali-Americana, p. 7.

Shell depressed-helicoid, covered with a straw-colored periostracum. Nuclear whorls almost 2, small, well rounded. Postnuclear whorls well rounded, marked by rather rough, retractively slanting, somewhat irregular, rather strongly raised axial riblets. Suture deeply impressed. Periphery well rounded. Base well rounded, marked by the continuation of the axial ribs, which pass undiminished over the umbilical wall. Umbilicus broad. The last whorl is solute for about one-tenth of a turn; the auricular portion of the peristome, however, is attached to the preceding turn. Aperture subcircular; peristome rather broadly expanded and reflected. The parietal wall bears a deep U-shaped notch.

The specimen described and figured, U.S.N.M. No. 321058, comes from Veracruz, Mexico. It has 5.8 whorls and measures: Height, 15 mm.; greater diameter, 23.6 mm.; lesser diameter, 16.6 mm.

U.S.N.M. No. 321024 contains another specimen from Veracruz, and there are two additional lots from Mexico without specific locality in the collection of the National Museum.

This species differs from *C. goldmani* in having the peristome much more broadly expanded.

CYRTOTOMA GOLDMANI, new species

Plate 22, Figures 7–9

Shell depressed-helicoid, covered with a straw-colored periostracum. Nuclear whorls about 2, well rounded, forming a small elevated apex. Postnuclear whorls well rounded and marked by coarse, somewhat irregular, retractively slanting axial riblets, which vary in strength and are slightly sinuous. Suture deeply impressed. Periphery well rounded. Base openly umbilicated, well rounded, and marked by the continuation of the ribs, which pass over the umbilical wall. Aperture circular, slightly oblique. Peristome narrowly expanded, reflected, and marked with a very broad shallow U-shaped notch on the parietal wall. The last whorl may be solute or adnate to the preceding turn.

The type, U.S.N.M. No. 523516, was collected by Maj. E. A. Goldman at Mutaltoyuca, Puebla, Mexico. It has 6 whorls and measures: Height, 13.9 mm.; greater diameter, 20.9 mm.; lesser diameter, 15.3 mm.

U.S.N.M. No. 251719 contains 29 topotypes. Most of these are smaller than the type. The smallest has 5.5 whorls and measures: Height, 10.8 mm.; greater diameter, 16 mm.; lesser diameter, 12.1 mm.

This species is easily distinguished from *C. mexicanum* (Menke) by its narrow peristome and very broad U-shaped sinus in the parietal wall.

CYRTOTOMA WALKERI (H. B. Baker)

Plate 22, Figures 10–12

1928. *Aperostoma walkeri* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 193, p. 51, pl. 6, figs. 38–40.

Shell small, depressed-helicoid, horn colored, with the early whorls pinkish. The nucleus consists of about 2 small, well-rounded turns forming a well-elevated apex. Postnuclear whorls strongly rounded. The postnuclear whorls are somewhat inflated, strongly rounded, and marked by very regular, retractively curved, rather strong axial riblets, which are not as wide as the spaces that separate them. Suture channeled. Periphery well rounded. Base broadly openly umbilicated, with the axial sculpture much reduced, almost absent on the major portion of the base, but again strong on the umbilical wall, where it about equals that on the spire. Aperture subcircular; peristome thickened and slightly reflected, almost with an indication of a notch at the parietal wall. Operculum typically cyrtotomid.

The specimen described and figured is one of two paratypes, U.S.N.M. No. 515791, collected by H. B. Baker at Necaxa, Puebla, Mexico. It has 4.5 whorls and measures: Height, 8 mm.; greater diameter, 13.9 mm.; lesser diameter, 9.8 mm. Height of aperture, 5.3 mm.; diameter, 6.5 mm.

This species is easily distinguished from the others by its small size, weakly reflected peristome, and by the fact that notching of the parietal wall is almost absent.

BARBACYCLUS, new genus

Amphicyclotine shells of helicoid shape, spirally banded. The whorls are marked by oblique threads. The last whorl is very narrowly solute and the outer lip at the posterior angle projects beyond the junction with the parietal lip as a strong keel, which bends toward the preceding turn and almost touches it. Operculum with the outer edge of the turns provided with long scalelike fimbriations at the free edge, which are longer than the width of the turns, forming the solid portion of the operculum. The operculum therefore has a strongly bearded appearance.

Type: *Barbacyclus underwoodi* (Da Costa).

Distribution: Costa Rica.

B. boucardi (Angas) has the radula formula 3: 3: 3: 2, and the jaw is without a median projection.

KEY TO THE SPECIES OF BARBACYCLUS

Last whorl strongly sculptured -- princeps
Last whorl not strongly sculptured.
  Shell large; greater diameter more than 43 mm -------------- underwoodi
  Shell smaller; greater diameter less than 34 mm ----------------- boucardi

BARBACYLUS PRINCEPS (Pilsbry)

PLATE 23, FIGURES 1–3

1879. *Cyclotus boucardi* ANGAS, Proc. Zool. Soc. London, 1879, p. 483 (not *C. boucardi* Angas, Proc. Zool. Soc. London, 1878, p. 73).

1890. *Cyclotus* (*?*) *boucardi* VON MARTENS (in part), Biologia Centrali-Americana, p. 5.

1900. *Cyclotus boucardi* VON MARTENS, *ibid.*, Suppl., p. 597.

1935. *Aperostoma* (*Amphicyclotus*) *princeps* PILSBRY, Proc. Acad. Nat. Sci. Philadelphia, vol. 87, p. 3, pl. 1, figs. 1, 1a, 1b.

Shell large, helicoid, of white ground color, marked with bands of chestnut-brown. One of these bands, which is rather broad, appears to occupy the middle of the turns; the other is immediately below the periphery. Nuclear whorls 2, well rounded, smooth. Postnuclear whorls well rounded, appressed at the summit, except the last turn, marked by decidedly retractively slanting axial threads, which are crossed by strong incremental lines. These threads begin a little anterior to the summit of the turns and are about as wide as the spaces that separate them. Suture slitlike on the last turn, separated from the preceding turn by a considerably deeper channel on the last fifth of a turn. Periphery well rounded. Base well rounded and marked by the continuation of the oblique cords, which also extend over the umbilical wall. Umbilicus about one-fourth the diameter of the shell. Aperture circular; peristome somewhat thickened, heaviest on the outer lip and thinnest on the columellar side. In the outer lip the peristome projects over the wall of the parietal portion of the peristome as an arch, which also projects forward considerably beyond the parietal peristome. Operculum typical.

The specimen described and figured, U.S.N.M. No. 523517, was collected by H. Pittier in Costa Rica without specific definition of locality. It has 6.1 whorls and measures: Height, 24.7 mm.; greater diameter, 41.7 mm.; lesser diameter, 30.7 mm.

Three additional specimens, U.S.N.M. No. 190287, were collected by Pittier at Moin Hill, Costa Rica.

The strong oblique threads that extend even over the last whorl in this species readily differentiate it from the other two.

BARBACYCLUS UNDERWOODI (Da Costa)

Plate 23, Figures 7–9

1900. *Cyclophorus underwoodi* Da Costa, Proc. Malac. Soc. London, vol. 4, p. 67, pl. 7, figs. 5–8.

1900. *Cyclophorus* (*Amphicyclotus*) *underwoodi* von Martens, Biologia Centrali-Americana, Suppl., p. 598.

1902. *Amphicyclotus underwoodi* Kobelt, Das Tierreich, Cyclophoridae, p. 257.

1912. *Amphicyclotus underwoodi* Kobelt, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 919, pl. 135, figs. 2–4, 4a.

Shell large, helicoid, of soiled-white ground color, with the early whorls rose-red. The later whorls are marked also with a very dark chestnut-brown band, which extends from a little below the suture to a little above the periphery, and a second one much narrower immediately below the periphery. The periphery in our specimens is white. The base is orange straw-colored. Nuclear whorls about 2, well rounded, smooth. The early postnuclear whorls are marked by decidedly retractively curved almost spiral threads, which are about as wide as the spaces that separate them. These threads disappear on the last half of the last whorl. Suture of the early whorls well impressed; on the last, deeply channeled. The summit of the whorls on the last half of the last turn projects over the parietal wall in such a manner as to form a decided crest, which continues in an even curve with the rest of the upper surface of the whorl toward the preceding turn, leaving a broad exposed channel. Periphery well rounded. Base well rounded. Umbilicus moderately large, a little more than one-fourth of the diameter of the shell and marked by fine incremental lines and on the first half by feeble suggestions of spiral threads. No spiral threads appear on the rest of the umbilical wall. Here the incremental lines are concentrated to form axial riblets. Aperture circular; peristome simple, very slightly expanded; the outer lip projects materially beyond its junction with the columellar wall at the posterior angle, forming here a conspicuous shelf. It also is decidedly protracted at that point beyond the columellar lip. Operculum typically barbacyclid.

The specimen described and figured, U.S.N.M. No. 161616, comes from Costa Rica. It has 6 whorls and measures: Height, 31.5 mm.; greater diameter, 44.8 mm.; lesser diameter, 31.6 mm.

U.S.N.M. No. 321046 contains another specimen also from Costa Rica, without definite locality.

This species is nearest related to *B. boucardi* (Angas), from which its much larger size readily distinguishes it.

BARBACYCLUS BOUCARDI (Angas)

PLATE 23, FIGURES 4–6

1878. *Cyclotus boucardi* ANGAS, Proc. Zool. Soc. London, 1878, p. 73, pl. 5, figs. 3, 4.

1890. *Cyclotus* (?) *Boucardi* v. MARTENS (in part), Biologia Centrali-Americana, p. 5.

1897. *Neocyclotus* (*Neocyclotus*) *boucardi* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

1935. *Aperostoma princeps angasianum* PILSBRY, Proc. Acad. Nat. Sci. Philadelphia, vol. 87, p. 3.

Shell helicoid, chestnut-brown on the upper surface, with a moderately broad band of white at the summit and at the periphery. There is a zone of the same chestnut-brown immediately below the periphery, while the rest of the base is straw colored. Nuclear whorls about 2, well rounded, smooth. The succeeding turns, except the last portion of the last whorl, are marked by decidedly retractively curved threads, which are about as wide as the spaces that separate them. In addition to this they are also crossed by numerous closely spaced, hairlike incremental lines. Suture impressed, on the last turn marked by a slender, slitlike sinus. The last whorl is decidedly decurrent and solute for about one-tenth of a turn. Periphery well rounded. Base well rounded, marked by incremental lines and near the periphery by obsolete threads. Umbilicus rather narrow, equaling about one-fifth of the diameter of the shell. Aperture broadly oval, the long axis being from the parietal wall to the junction of the outer and basal lip; peristome simple, the outer lip extends beyond its junction with the columellar wall as a shelf. It also is protracted beyond it. Operculum typical.

The specimen described and figured, U.S.N.M. No. 162825, is one of two collected at San Carlos, Costa Rica. It has 5.5 whorls and measures: Height, 25.2 mm.; greater diameter, 33 mm.; lesser diameter, 25 mm.

This species resembles most nearly *B. underwoodi* (Da Costa), from which its small size readily distinguishes it.

CALACYCLOTUS, new genus

Amphicyclotine shells of helicoid outline, without color bands, with the axial sculpture reduced to incremental lines, and the spiral sculpture absent or microscopic. Base widely umbilicated. Aperture decidedly oblique; outer lip of peristome somewhat expanded and reflected at the outer lip, the parietal and columellar peristome forming a sigmoid edge.

Type: *Calacyclotus olssoni* (Pilsbry).

Distribution: Panama and Colombia.

KEY TO THE SPECIES OF CALACYCLOTUS

Greater diameter more than 50 mm	olssoni
Greater diameter less than 42 mm	atratensis

CALACYCLOTUS OLSSONI (Pilsbry)

Plate 23, Figures 13–15

1926. *Amphicyclotus olssoni* Pilsbry, Proc. Acad. Nat. Sci. Philadelphia, vol. 78, pp. 65–66, pl. 9, figs. 1, 1a.

Shell very large, uniformly chestnut-brown, with the tip red and the inside of the aperture bluish white. Nuclear whorls about 2, well rounded, smooth, forming an inconspicuous apex. Postnuclear whorls well rounded, marked by slender, retractively curved incremental lines only. Suture well impressed. Periphery strongly rounded. Base well rounded, openly umbilicated, with the umbilicus about equal to one-fourth of the diameter of the shell, marked by the continuation of the incremental lines, which pass over the umbilical wall, where they became somewhat stronger. Aperture decidedly oblique, broadly pear-shaped, protracted into an angle at the posterior angle of the aperture. Peristome expanded on the outer and right portion of the basal lip, thickened on the inner lip. Parietal wall covered with a moderately thick callus, which forms an obtuse angle at its junction with the columella. Pilsbry says of the operculum of this species: "The operculum is flat, dull brownish, of about 12 whorls, the outer four subequal, diminishing slightly to the last, smoothish. Interior face with a small central mucro with a low encircling ridge forming a ring of about 5 mm. diameter. The dull scar of attachment is broadly oval, eccentric, its edge notched where it passes the mucro."

The specimen described and figured, U.S.N.M. No. 341767, was collected by A. E. Heighway at Acandi, a small settlement in the Gulf of Atrato, on the boundary between Panama and Colombia. It has 6.1 whorls and measures: Height, 33 mm.; greater diameter, 53.8 mm.; lesser diameter, 39 mm.

The large size readily distinguishes this species from *C. atratensis.*

CALACYCLOTUS ATRATENSIS, new species

PLATE 23, FIGURES 10–12

Shell helicoid, covered with a chestnut-brown periostracum; the early whorls reddish; interior of the aperture yellowish white. Nuclear whorls about 2, well rounded, smooth, forming a small apex. Postnuclear whorls marked by rather irregular, retractively slanting incremental lines. Suture moderately impressed. Periphery well rounded. Base openly umbilicated, the umbilicus being about one-fourth the diameter of the shell, marked by the continuation of the incremental lines, which here assume almost the strength of riblets; these pass also over the umbilical wall. Aperture decidedly oblique, almost circular, protracted into an auricle at the posterior angle. Peristome somewhat expanded on the outer lip and somewhat thickened on the inner, covering the parietal wall with a thick callus. The edge of this callus on the parietal wall and columella forms a decidedly ragged sigmoid curve.

The type, U.S.N.M. No. 206291, was collected by A. E. Heighway on the mountains near the mouth of the Atrato River in Colombia. It has 5.9 whorls and measures: Height, 25.2 mm.; greater diameter, 41 mm.; lesser diameter, 31 mm.

The small size readily distinguishes this species from *C. olssoni* (Pilsbry).

MEXCYCLOTUS, new genus

Small amphicyclotine shells of helicoid outline, marked by axial hairlines only. Operculum corneous, concave, with more than 10 whorls, which have their outer edge upturned, free, or appressed to the succeeding whorl. The turns of the lamella are obliquely striated.

Type: *Mexcyclotus lutescens* (Pfeiffer).

Distribution: Southwestern Mexico.

The members of the genus recall *Aperostoma* (*Cyclohidalgoa*) *translucidum* (Sowerby), but that group has a calcareous operculum.

KEY TO THE SPECIES OF MEXCYCLOTUS

Shell helicoid	cooperi
Shell depressed-helicoid	lutescens

MEXCYCLOTUS COOPERI (Tryon)

PLATE 24, FIGURES 10–12

1863. *Cyclotus cooperi* TRYON, Proc. Acad. Nat. Sci. Philadelphia, 1863, p. 281, pl. 2, fig. 2.

1890. *Cyclophorus* (*Amphicyclotus*) *lutescens* VON MARTENS (in part), Biologia Centrali-Americana, p. 7.

1897. *Cyrtotoma lutescens* var. *cooperi* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 140.

1898. *Amphicyclotus lutescens* var. *cooperi* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 139 (reprint).

1928. *Aperostoma cooperi* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 193, p. 53.

Shell elevated helicoid, covered with a thin pale orange periostracum, which shows slender, distantly spaced, and irregularly distributed spiral threads of a brighter yellow on the spire. Interior of aperture yellowish white. Nuclear whorls 1.2, well rounded, forming a small apex. Postnuclear whorls inflated, strongly rounded, and marked by rather distantly spaced, slender, retractively curved axial riblets, which become somewhat irregular on the last turn. Suture strongly impressed. Periphery inflated, well rounded. Base well rounded, openly umbilicated, with the umbilicus about one-fourth the diameter of the shell, marked by the enfeebled ribs, which here constitute merely irregular incremental lines. These also pass over the umbilical wall. Aperture slightly oblique, circular, feebly angulated at the posterior angle of the aperture; peristome very thin on the outer lip and considerably thickened on the inner lip. Operculum typical.

The type, Acad. Nat. Sci. Philadelphia No. 10019, was collected by August Remond near Mazatlan, Sinaloa, Mexico. It has 4.8 whorls and measures: Height, 14 mm.; greater diameter, 16 mm.; lesser diameter, 12.8 mm.

U.S.N.M. No. 251718 contains 12 additional dead shells, some of which are considerably larger than the type. One of these has 3 whorls remaining and measures: Height, 14 mm.; greater diameter, 17.8 mm.; lesser diameter, 14.5 mm. Still another specimen, U.S.N.M. No. 251717, was collected by Dr. E. W. Nelson at San Sebastian, Jalisco. Dr. Nelson also collected a series of specimens at Ixtapan, Jalisco, Mexico. While there is considerable variation in the size of these, they agree quite well with Tryon's type.

This species can readily be distinguished from *M. lutescens* (Pfeiffer) by its much more elevated form and stronger ribbing.

MEXCYCLOTUS LUTESCENS (Pfeiffer)

Plate 24, Figures 13–15

1851. *Cyclostoma* (*Cyclophorus*) *lutescens* Pfeiffer, Proc. Zool. Soc. London, 1851, p. 250.
1854. *Cyclostoma lutescens* Pfeiffer, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 333, pl. 43, figs. 12–14.
1886. *Habropoma lutescens* Fischer and Crosse, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, pl. 38, fig. 2.
1888. *Amphicyclotus lutescens* Fischer and Crosse, *ibid.*, vol. 2, pt. 7, p. 139.
1890. *Cyclophorus* (*Amphicyclotus*) *lutescens* von Martens, Biologia Centrali-Americana, p. 6.
1897. *Cyrtotoma lutescens* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 140.
1898. *Amphicyclotus lutescens* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 139 (reprint).
1928. *Aperostoma lutescens* H. B. Baker, Occ. Pap. Mus. Zool., Univ. Michigan, No. 193, p. 53.

Shell depressed-helicoid, covered with a straw-colored, orange-tinged periostracum, with the early whorls a little darker than the later. Interior of the aperture bluish white. The nucleus consists of one rounded smooth turn. The early postnuclear whorls are strongly rounded and marked by rather distantly spaced, slender axial riblets which become less regular and more closely spaced on the last whorl. Suture strongly impressed. Periphery well rounded. Base well rounded and marked by the weak continuation of the axial sculpture, which extends over the umbilical wall. Umbilicus about one-fifth the diameter of the shell. Aperture circular, slightly oblique; peristome slightly oblique, slightly protracted into an angle at the posterior angle; outer lip of the peristome thin; the inner somewhat thickened.

The specimen described and figured is one of two, U.S.N.M. No. 301012, collected by Sallé in Mexico without specific locality. It has 4.6 whorls and measures: Height, 10.7 mm.; greater diameter, 14.7 mm.; lesser diameter, 11.8 mm.

There are two additional lots, three specimens, in the collection of the National Museum, without specific locality.

This species can readily be distinguished from *M. cooperi* (Tryon) by its depressed form.

MEGACYCLOTUS, new genus

Amphicyclotine shells of helicoid shape. The whorls are marked by fine spiral lines and heavier, decidedly retractively curved, coarser diagonal threads on spire and base; absent on the wall of the broad umbilicus. Peristome slightly expanded on the outer lip. Operculum thin, corneous, with central nucleus, the outer edge of whose upturned volutions are rendered ragged by wear. They are retractively striate.

Type: *Megacyclotus ponderosus* (Pfeiffer).

Distribution: Southeastern Mexico and Guatemala.

The radula of *M. ponderosus* (Pfeiffer) has the formula 3:3:3:2, and the jaw is without a median projection.

KEY TO THE SPECIES OF MEGACYCLOTUS

Shell more than 40 mm. in diameter	ponderosus
Shell less than 35 mm. in diameter	palenquensis

MEGACYCLOTUS PONDEROSUS (Pfeiffer)

PLATE 24, FIGURES 19–21

1851. *Cyclostoma ponderosum* PFEIFFER, Proc. Zool. Soc. London, 1851, p. 243.

1852. *Cyclophorus ponderosus* PFEIFFER, Monographia pneumonopomorum viventium, vol. 1, p. 97.

1853. *Cyclostoma ponderosum* PFEIFFER, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 257, pl. 35, figs. 12–14.

1880. *Amphicyclotus ponderosus* FISCHER and CROSSE, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pl. 35, fig. 3.

1888. *Amphicyclotus ponderosus* FISCHER and CROSSE, *ibid.*, vol. 2, pt. 7, p. 147.

1890. *Cyclophorus* (*Amphicyclotus*) *ponderosus* v. MARTENS, Biologia Centrali-Americana, p. 5.

1900. *Cyclophorus* (*Amphicyclotus*) *ponderosus* v. MARTENS, *ibid.*, Suppl., p. 597.

Shell rather large, depressed-helicoid, covered with a thin pale-brown periostracum, which appears to have irregular darker radial zones. The nucleus consists of a little more than one small, well-rounded, smooth whorl. Postnuclear whorls are well rounded, slightly flattened toward the summit and marked by coarse, decidedly retractively curved diagonal cords and fine incremental lines. The spiral cords are about as wide as the spaces that separate them and are rendered rather irregular by the incremental lines. Suture moderately impressed. Periphery well rounded. Base well rounded, openly umbilicated, with the umbilicus almost one-third the diameter of the shell. The base is marked like the spire, but the umbilical wall has only the continuation of the incremental lines, which here develop into irregular riblets. Aperture circular, drawn into a conspicuous angle at the posterior angle of the aperture. Peristome simple, thin on the outer lip and a little thicker on the inner. Parietal wall covered by a moderately thick callus.

The specimen described and figured, U.S.N.M. No. 32068, was collected by F. Sarg in Guatemala. It has 5.5 whorls and measures: Height, 25.7 mm.; greater diameter, 40.7 mm.; lesser diameter, 30.3 mm.

Several specimens from northern Guatemala, U.S.N.M. No. 162309, collected by Godman, are much larger, one having 4 whorls and measuring: Height, 27 mm.; greater diameter, 48.5 mm.; lesser diameter, 36 mm. U.S.N.M. No. 429586 contains three specimens collected by H. Pittier at an elevation of 550 meters in the vicinity of Secanquin, Alta Vera Paz. U.S.N.M. No. 185499 contains another specimen from the same locality. U.S.N.M. No. 355368 contains two specimens collected by A. A. Hinkley at Chama, Alta Vera Paz. There are six additional lots without specific locality.

This species differs from *M. palenquensis* (Pilsbry) in being much larger.

MEGACYCLOTUS PALENQUENSIS (Pilsbry)

PLATE 24, FIGURES 16–18

1935. *Aperostoma* (*Amphicyclotus*) *palenquense* PILSBRY, Proc. Acad. Nat. Sci. Philadelphia, vol. 87, pp. 3–4, pl. 1, figs. 3, 3a, 3b.

Shell depressed-helicoid, covered with a wood-brown periostracum; when denuded the last whorl is yellowish white and the rest rose colored. The nucleus consists of a little more than one turn, which is well rounded and smooth. The succeeding turns are well rounded and marked by decidedly retractively curved threads, which are about as wide as the spaces that separate them. These threads and the spaces between them vary in strength, and the surface has a somewhat pitted or dull rasplike appearance. Suture well impressed. Periphery well rounded. Base openly umbilicated, well rounded, and marked by the same sculpture as that characterizing the spire, only a little less strongly developed. The umbilicus is similarly sculptured. Aperture circular, decidedly oblique, drawn out into a very conspicuous angle at the posterior angle. Peristome simple; the outer somewhat expanded and reflected; the inner evenly curved, forming with the callus of the parietal wall, a regular sigmoid outline.

The type, Acad. Nat. Sci. Philadelphia No. 106344, was collected by Dr. Dolley in the District of Palenque, State of Chiapas, Mexico. It has 5 whorls and measures: Height, 20.7 mm.; greater diameter, 34 mm.; lesser diameter, 25.9 mm. A paratype bearing the same number has 5.4 whorls and measures: Height, 21.7 mm.; greater diameter, 34.3 mm.; lesser diameter, 26.1 mm.

This species differs from *M. ponderosus* (Pfeiffer) in being considerably smaller.

Genus AMPHICYCLOTUS Crosse and Fischer

1879. *Amphicyclotus* CROSSE and FISCHER, Journ. Conchyl., vol. 27, p. 46.

Amphicyclotine shells of helicoid outline, with the whorls marked by fine vermiculated sculpture, which extends over spire, base, and umbilical wall. Operculum thin, corneous, with central nucleus, having the outer edge of the turns slightly upturned.

Type: *Amphicyclotus boucardi* ([Sallé] Pfeiffer).

Distribution: Southeastern Mexico to northwestern Honduras.

KEY TO THE SPECIES OF AMPHICYCLOTUS

Shell large; greater diameter more than 50 mm ………… goldfussi
Shell smaller; greater diameter less than 40 mm.
- Shell helicoid.
  - Greater diameter more than 30 mm ………… boucardi
  - Greater diameter less than 27 mm ………… maleri
- Shell depressed-helicoid ………… texturatus

AMPHICYCLOTUS GOLDFUSSI (Boettger)

1892. *Aperostoma* (*Amphicyclotus*) *goldfussi* Boettger, Nachrb. deutschen malak. Ges., vol. 24, p. 203.
1897. *Amphicyclotus goldfussi* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 139.
1900. *Cyclophorus* (*Amphicyclotus*) *texturatus goldfussi* von Martens, Biologia Centrali-Americana, Suppl., p. 598.

Shell depressed-conic, rather thick walled, uniformly brownish yellow, broadly umbilicated; umbilicus one-fourth the greater diameter of the shell. Apex rather rounded. The spire consists of 6 rounded whorls, which are somewhat flattened near the suture and increase rather rapidly in size. They are everywhere finely wrinkled. In the middle the whorls are wormlike, separated by impressed grooves. The last whorl equals one-third of the diameter and is compressed above, circular, and slightly decurrent anteriorly. Aperture oblique, almost circular, white and shining, thin; peristome simple, sharp at the edge, connected with a heavy callus on the parietal wall. The peristome is protracted into a slight auricle at the posterior angle, which is furrowed; it is somewhat projecting on the right edge and thickened on the columellar side. Operculum corneous, thin, consisting of closely wound whorls. Height, 28 mm.; greater diameter, 51 mm.; lesser diameter, 22 mm.

The type was collected at San Pedro Sula, northwestern Honduras.

We have not seen specimens of this species and have given a translation of its description; it has not been figured.

The very large size of this species readily distinguishes it from the rest.

AMPHICYCLOTUS BOUCARDI ([Sallé] Pfeiffer)

Plate 24, Figures 4–6

1856. *Cyclostoma* (*Cyclophorus*) *boucardi* [Sallé] Pfeiffer, Proc. Zool. Soc. London, vol. 24, p. 323, pl. 35, fig. 25.
1858. *Cyclophorus boucardi* Pfeiffer, Monographia pneumonopomorum viventium, vol. 2, p. 65.
1861. *Cyclophorus boucardi* Reeve, Conchologia iconica, vol. 13, sp. 26.
1880. *Amphicyclotus boucardi* Fischer and Crosse, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, pl. 35, fig. 1.
1888. *Amphicyclotus boucardi* Fischer and Crosse, *ibid.*, vol. 2, pt. 7, p. 142.
1890. *Cyclophorus* (*Amplicyclotus*) *boucardi* von Martens, Biologia Centrali-Americana, p. 6.

Shell helicoid, covered with a pale chestnut-brown periostracum, which is vermiculated and spirally banded by zones of the ground color, that is, bluish white; the interior of the aperture is bluish white. The nucleus consists of 1.5 small smooth turns; the succeeding 2 turns are finely, retractively, axially ribbed, the axial ribs being about as wide as the spaces that separate them. The rest of the whorls are finely vermiculated by irregularly disposed, closely placed, low nodules. In addition to this the whorls are marked by incremental lines. Suture deeply impressed, particularly so on the early whorls. Periphery well rounded. Base somewhat inflated, strongly rounded, sculptured like the spire. This sculpture also extends over the umbilical wall. The umbilicus is about one-fourth of the diameter of the shell. Aperture circular; peristome simple, the outer lip thin, the inner very slightly thickened. Parietal wall covered by a thin callus. Operculum typical.

The specimen described and figured, U.S.N.M. No. 356095, was collected by Dr. L. A. Yates in southeastern Mexico. It has 5.6 whorls and measures: Height, 23.7 mm.; greater diameter, 31.4 mm.; lesser diameter, 22.6 mm.

U.S.N.M. No. 321013 contains two additional specimens labeled "Mexico," without specific locality.

AMPHICYCLOTUS MALERI Crosse and Fischer

PLATE 24, FIGURES 7–9

1883. *Amphicyclotus maleri* CROSSE and FISCHER, Journ. Conchyl., vol. 31, p. 102.
1886. *Amphicyclotus maleri* FISCHER and CROSSE, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, pl. 41, figs. 3, 3a, 3b, 3c.
1888. *Amphicyclotus maleri* FISCHER and CROSSE, *ibid.*, vol. 2, pt. 7, p. 145.
1890. *Cyclophorus* (*Amphicyclotus*) *maleri* VON MARTENS, Biologia Centrali-Americana, p. 6.

Shell helicoid; when denuded of periostracum, soiled white. Nuclear whorls 1.5, small, well rounded, smooth. Postnuclear whorls strongly rounded and marked by numerous vermiculations. The threads composing these are as wide as the spaces that separate them. The whorls are appressed at the summit, which leaves the suture rather inconspicuous. Periphery well rounded. Base openly umbilicated, the umbilicus about one-fourth the diameter of the shell. The base is marked by the continuation of the vermiculations, which extend over the umbilical wall. Aperture oblique, circular; peristome simple, slightly protracted into an angle at the posterior angle; outer lip thin, the inner somewhat thickened.

The specimen described and figured, U.S.N.M. No. 515887, was collected by F. Sarg in Guatemala. It has 5.5 whorls and measures: Height, 18.3 mm.; greater diameter, 26.3 mm.; lesser diameter, 20.5 mm.

Crosse and Fischer's specimen came from Tabasco Province, Mexico, but we believe the specimen we have figured belongs here.

The species is easily distinguished from the others by its small size.

AMPHICYCLOTUS TEXTURATUS (Sowerby)

PLATE 24, FIGURES 1-3

1850. *Cyclostoma texturatum* SOWERBY, Thesaurus conchyliorum, Suppl., p. 160*, pl. 31A, fig. 303.

1852. *Cyclophorus texturatus* PFEIFFER, Conspectus cyclostomaceorum emendatus auctus . . ., p. 15.

1880. *Amphicyclotus texturatus* FISCHER and CROSSE, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, pl. 35, figs. 2-2b.

1886. *Amphicyclotus texturatus* FISCHER and CROSSE, *ibid.*, vol. 2, pt. 7, p. 144.

1890. *Cyclophorus* (*Amphicyclotus*) *texturatus* VON MARTENS, Biologia Centrali-Americana, p. 6.

Shell depressed-helicoid, covered with a chestnut-brown periostracum. Nuclear whorls 1.5, small, well rounded, smooth. The first postnuclear whorl is marked by fine incremental lines which are more emphasized at the channeled suture and eventually developed into little riblets before the real postnuclear sculpture is reached. The later whorls are marked by strong vermiculations. Suture well impressed. Periphery well rounded. Base openly umbilicated, with the umbilicus about two-fifths of the diameter of the shell. The base and umbilical wall are both marked by vermiculations, although on the umbilical wall they become more elongated and more riblike. Aperture circular, slightly angulated at the posterior angle; peristome simple, thin. Parietal wall covered by a heavy callus. The operculum has a subcentral nucleus and consists of about 10 whorls, which are flattened and slightly free at the distal edge and striated.

The specimen described and figured, U.S.N.M. No. 162491, comes from Chiapas, Mexico. It has 5.5 whorls and measures: Height, 26.7 mm.; greater diameter, 41.1 mm.; lesser diameter, 29.7 mm.

The collection of the National Museum contains additional specimens as follows:

U.S.N.M. No. 162310, from Coban, Guatemala; U.S.N.M. No. 200694, 1 from Finca Providencia, Guatemala; U.S.N.M. No. 321044, 1 from Guatemala, without specific locality; U.S.N.M. No. 32072, 1 collected by F. Sarg in Guatemala; U.S.N.M. No. 316370, 2 from Mexico, without specific locality.

Subfamily APEROSTOMINAE Torre and Bartsch

This subfamily has been defined on p. 38.

KEY TO THE MAINLAND GENERA OF THE SUBFAMILY APEROSTOMINAE

Calcareous deposits on outside of whorls of operculum fused______	Aperostoma
Calcareous deposits on outside of whorls of operculum not fused__	Liracyclotus

Genus APEROSTOMA Troschel

1847. *Aperostoma* TROSCHEL, Zeitschr. Malak., vol. 4, p. 44.

Aperostomine shells in which the heavy calcareous deposit of adjacent turns of the operculum fuses. This deposit is a little higher on the inner edge of the turns.

Type: *Aperostoma* (*Aperostoma*) *blanchetianum* (Moricand).

Distribution: Mexico to Brazil and the West Indies.

KEY TO THE SUBGENERA OF MAINLAND APEROSTOMA

- Aperture with a notch at posterior angle --- Incidostoma
- Aperture without a notch at posterior angle.
  - Sculpture engine-turned --- Austrocyclotus
  - Sculpture not engine-turned.
    - Sculpture anastomosing --- Neocyclotus
    - Sculpture not anastomosing.
      - Sculpture scalariform --- Cyclopomops
      - Sculpture not scalariform.
        - Periphery with color band --- Aperostoma
        - Periphery without color band --- Cyclohidalgoa

INCIDOSTOMA, new subgenus

Aperostomine shells of helicoid or depressed-helicoid shape. Spire and base marked by slender, retractively curved axial riblets, which are much stronger on the umbilical wall. The surface may or may not be malleated. The posterior angle of the aperture in adult shells is notched or even developed into a pseudosiphon.

Type: *Aperostoma* (*Incidostoma*) *malleatum*, new species.

Distribution: Colombia, Ecuador, and Peru.

KEY TO THE SPECIES OF THE SUBGENUS INCIDOSTOMA

- Greater diameter more than 45 mm.
  - Upper surface malleated.
    - Malleations strong --- malleatum
    - Malleations not strong --- pergrandis
  - Upper surface not malleated.
    - Diameter more than 53 mm --- kobelti
    - Diameter less than 48 mm.
      - Shell helicoid --- pichinchense
      - Shell depressed-helicoid --- hedui
- Greater diameter less than 38 mm.
  - Auricle very projecting --- incomptum
  - Auricle not very projecting.
    - Greater diameter more than 35 mm.
      - Aperture very large --- pizarroi
      - Aperture not very large.
        - Suture deeply impressed --- nirafe
        - Suture not deeply impressed --- hitomi
    - Greater diameter less than 28 mm --- stirlingi

APEROSTOMA (INCIDOSTOMA) MALLEATUM, new species

PLATE 25, FIGURES 4–6

Shell large, very depressed-helicoid. The early whorls pale brown, the last 1.5 turns pale chestnut brown, with the posterior half of the first dark chestnut-brown and the anterior half and umbilical wall of about the same shade as the upper side of the last turn. There is a pale narrow peripheral line below which a narrow almost black band is present. The nucleus consists of 2 turns, which are small, well rounded, and smooth. The succeeding turns are well rounded and marked by decidedly retractively slanting axial riblets, which on the last 1.5 turns become irregular in strength and spacing. On this part of the shell the upper surface, too, shows irregular malleations. The suture is strongly impressed. The summit of the last whorl is slightly deflected. Periphery feebly angulated. Base openly umbilicated, somewhat inflated, strongly rounded, and marked by the continuation of the axial riblets, which become very materially strengthened on the umbilical wall, where they form rather rough strong ribs. The base also and umbilical wall show the malleations referred to for the spire. Aperture circular, except the posterior angle, where the outer lip is reflected backward to form an incomplete siphon, which extends some distance beyond the periphery and is separated from the preceding turn by a mere slit. There is a profound sinus in the peristome at the posterior angle. Peristome thickened, almost double on the inner lip and thin on the outer and basal lip. Operculum typically aperostomid, of about 9 whorls.

The type, U.S.N.M. No. 317578, comes from the Evezard collection. It is without locality. It has 4.7 whorls and measures: Height, 24.8 mm.; greater diameter, 48 mm.; lesser diameter, 34.5 mm. Height of aperture, 15.8 mm.; diameter, 21.2 mm.

We hesitate to describe a species without definite locality, but because the strong malleations of this species differentiate it from all other forms before us, we feel it merits recognition.

APEROSTOMA (INCIDOSTOMA) PERGRANDIS (Kobelt)

PLATE 25, FIGURES 1–3

1912. *Neocyclotus pergrandis* KOBELT, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, pt. 3, p. 887, pl. 132, figs. 4–6.

1923. *Poteria* (*Neocyclotus*) *pergrandis* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 30.

We have not seen this species and so give a translation of Kobelt's description:

Shell apparently the largest of the genus, openly, broadly umbilicated, depressed, thick-walled, coarsely striated with oblique, irregular ribbed striations, chestnut brown with diffused, irregularly distributed spots. The last whorl has a narrow yellowish line at the peripheral angle and below this a somewhat broader darker zone, which evanesces anteriorly. The whorls are comparatively small and project but slightly, smooth, of pale color (injured in the single specimen before us). There are 5.5 convex turns, of which the earlier ones increase in size gradually, and the later ones more rapidly. They are separated by a deep suture, which is channeled in the later portion. The last whorl has a distinct angulation at the periphery and is more strongly arched basally than on the upper part and irregularly coarsely malleated. The last whorl is somewhat flattened near the suture. The posterior part of the peristome of the outer lip is bent up to form a small hooklike auricle. I know of none like it in any American operculate. Aperture very large, only slightly oblique, irregularly tear-shaped, broadly rounded basally, pointed toward the posterior angle, where it passes into the auricle, bluish white within. The parietal wall is covered with a half-moon-shaped slight callus. The outer peristome is sharp edged, bent backward above and free from the preceding whorl so that a deep sinus is created. It is bent upward above the periphery of the preceding turn to form an auricle. The columellar peristome is thickened and white and slightly effuse. The operculum, unfortunately, is broken but there is enough of it to show that it is a genuine *Neocyclotus* operculum, although it is not strongly thickened, but it bears numerous whorls with a threadlike projection on the inner edge of the turns. It is not impressed in the middle.

Habitat: New Granada (Colombia).

The specimen I received in the winter of 1872 to 1873 direct with some other land shells. My friend Martens, to whom I showed the shell, said that it was an over-developed example of *Cyclotus incomptus* Sowerby, and under this name it has rested until now in the Senckenbergische Museum. That species has also a sinus at the posterior angle.

Kobelt's figure shows a specimen not quite mature, which we believe related to *A.* (*I.*) *malleatum*. Probably due to immaturity, the siphonlike development at the posterior angle has not attained its full figure. Kobelt's figure yields the following measurements: It has 4.8 whorls and measures: Height, 26.3 mm.; greater diameter, 53.0 mm.; lesser diameter, 37.3 mm. Height of aperture, 18.4 mm.; diameter, 22.8 mm.

APEROSTOMA (INCIDOSTOMA) KOBELTI, new species

PLATE 25, FIGURES 7–9

1912. *Neocyclotus pergrandis* var. KOBELT, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, pt. 3, p. 903, pl. 140, figs. 1–3.

We have not seen anything that would satisfy Kobelt's description and figure and therefore give a translation of his description of *Neocyclotus pergrandis* var.:

A magnificent specimen in the Berlin Museum, which Professor Thiele has permitted me to see, leads me to refer again to *Neocyclotus pergrandis*, * * * the highest development of which is probably represented by this specimen. It is somewhat larger than the specimens which I figured from the collection of the Senckenbergische Museum. The greatest diameter is 57 mm. and the least diameter, 46; height, 28 mm. Its conservation is splendid, its sheen and coloration faultless. The suture is materially more strongly impressed and this character can be followed to the third last whorl. The whorls therefore project only slightly. The last whorl has a pronounced peripheral keel, which does not show in *pergrandis*. This forms the boundary between the yellowish white peripheral band and the blackish brown infraperipheral zone. About 2 cm. behind the peristome, which is decidedly deflected, the siphonlike auricle arises. This measures 13–14 mm. in diameter at the base and is appressed to the preceding whorl and projects above this for half its length. The interior of the siphonlike perforation is covered with a pearly callus and forms an open aperture separated from the preceding turn by a narrow slit. The siphonal puncture measures about 4–5 mm. long. The opening to it is observable only when one looks at it obliquely from below. Between the peristome and the tubular structure the last whorl is free from the preceding turn and decurrent, that is, overhanging the aperture. The breadth of the aperture is 25 mm., and the height obliquely measures about the same; vertically it is somewhat less. The interior of the aperture is livid white, shining, through which the infraperipheral band shines bluish.

The specimen described comes from Cundinamarica, between Bojaca and Tene, on the Lake of Tedropalo, Colombia, and bears the catalog number 37582.

In this species the siphonal development at the posterior angle is larger and stronger than in any other form we have seen. It also appears to lack the malleation described for *A.* (*I.*) *malleatum* and *A.* (*I.*) *pergrandis* (Kobelt).

Kobelt's figure yields the following measurements: Whorls, 4.5; height, 26.8 mm.; greater diameter, 54 mm.; lesser diameter, 39 mm. Height of aperture, 18.7 mm.; diameter, 24 mm.

APEROSTOMA (INCIDOSTOMA) PICHINCHENSE, new species

PLATE 26, FIGURES 10–12

Shell large, helicoid. The early whorls denuded of periostracum livid white; on the last one the periostracum is olivaceous with a brownish tinge on the upper surface. There is a narrow white peripheral zone, and the base is pale chestnut with an olivaceous tinge; interior of aperture bluish white. The nucleus consists of 2 small rounded, smooth turns. The postnuclear whorls are well rounded, slightly inbent at the suture on the last turn and marked by decidedly retractively curved axial riblets, which become decidedly irregular in strength and spacing on the last whorl. On this there are also oblique malleations resembling scratches. Suture strongly impressed. Periphery feebly angulated. Base openly umbilicated, inflated, strongly rounded, and marked by the continuation of the axial riblets, which become gradually intensified on the umbilical wall. Aperture circular, excepting the siphonlike projection at the posterior angle; peristome slightly thickened and reflected on the inner lip; thin on the outer, where it is produced at the posterior angle to form an incomplete siphon, separated there by a narrow slit. The parietal wall is covered with a thick callus. The peristome is rendered incomplete by the sinus at the posterior angle. Operculum typically aperostomid having about 9 whorls.

The type, U.S.N.M. No. 316109, comes from Quito, Ecuador. It has 5 whorls and measures: Height, 26.6 mm.; greater diameter, 47.6 mm.; lesser diameter, 35.1 mm. Height, of aperture, 16.2 mm.; diameter, 20.6 mm.

This species is readily distinguished from *A.* (*I.*) *malleatum* by its more elevated spire and less strongly malleated sculpture.

APEROSTOMA (INCIDOSTOMA) HEDUI, new species

PLATE 26, FIGURES 1–3

1863. *Cyclotus incomptus* REEVE, Conchologia iconica, vol. 14, sp. 8 (not *Cyclostoma incomptum* Sowerby, Thesaurus conchyliorum, vol. 1, Suppl., p. 160*, 1850).

Shell decidedly depressed-helicoid, almost planorbid; extreme tip reddish brown, the succeeding whorls pale brown, the last whorl chestnut-brown on the upper surface and dark chestnut-brown on the lower, with a narrow pale-brown peripheral zone. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are marked by decidedly retractively curved axial riblets, which become much enfeebled on the last whorl, where they are merely indicated. Suture very strongly impressed, narrowly channeled. The last whorl is slightly decurrent near the aperture. Periphery feebly angulated. Base openly umbilicated, well rounded, and marked by the continuation of the axial riblets, which become much strengthened on the umbilical wall. Aperture almost circular, excepting the siphonal projection at the posterior angle; peristome thickened, almost double on the columellar lip, thin on the outer lip, where it is projected upward over the periphery of the preceding turn and backward deflected with a narrow sinus between it and the preceding turn.

The type, U.S.N.M. No. 307480, comes from Brazil. It has 4.7 whorls and measures: Height, 23.5 mm.; greater diameter, 45.8 mm.; lesser diameter, 32.6 mm. Height of aperture, 16.7 mm.; diameter, 20.5 mm.

This is the most depressed of all the members we have seen, which feature alone readily distinguishes it from the other species.

APEROSTOMA (INCIDOSTOMA) INCOMPTUM (Sowerby)

PLATE 26, FIGURES 4–6

1850. *Cyclostoma incomptum* SOWERBY, Thesaurus conchyliorum, vol. 1, suppl., p. 160*, pl. 31A, figs. 298–299.

1852. *Pterocyclos incomptus* PFEIFFER, Monographia pneumonopomorum viventium, vol. 1, p. 42.

1853. *Pterocyclos incomptus* PFEIFFER, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 235, pl. 31, figs. 1–2.

1897. *Neocyclotus (Neocyclotus) incomptus* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

1923. *Poteria (Neocyclotus) incomptus* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 30.

Shell almost planorboid, decidedly depressed. The specimen before us has lost its periostracum and is white, with a brownish tinge on all but the last whorl. (Sowerby says of the type that it is covered with an olivaceous epidermis.) The nucleus consists of a little more than one turn, which is well rounded and smooth. The postnuclear whorls are strongly rounded and marked by somewhat irregular, broad, low, rounded, retractively curved axial riblets, which are wider than the spaces that separate them. Suture deeply impressed, almost channeled. Periphery with a faint indication of a thread. Base broadly openly umbilicated, showing all the whorls in the umbilicus. The base is strongly rounded and marked like the spire. Aperture circular with a strong auricle at the posterior angle, which is reflected and almost forms a siphon. Outer lip thin; the inner lip is slightly thickened.

The specimen described, U.S.N.M. No. 515940, has 4.4 whorls and measures: Height 17.8 mm.; greater diameter, 36.5 mm.; lesser diameter, 26.0 mm. Height of aperture, 14.6 mm.; diameter, 16.5 mm.

The small size and strongly reflected outer lip should readily distinguish this from the other smaller species. The shell described is from the J. B. Henderson collection; it bears no locality data. Sowerby's specimen, which he states is in Mr. Cuming's collection, is also without locality mention.

APEROSTOMA (INCIDOSTOMA) PIZARROI, new species

PLATE 26, FIGURES 7–9

Shell depressed-helicoid, chestnut-brown on the upper surface, with a narrow pale-yellow zone immediately above the periphery, while below the periphery there is a broad, very dark chestnut-brown band, which extends over two-fifths of the width of the base. Anterior to this and on the umbilical wall the shell is straw colored with a brownish flush and irregular zones of white. The nucleus consists of 1.6 small, well-rounded smooth turns. The postnuclear whorls are well rounded, the last one slightly flattened near the suture. The postnuclear whorls are marked by fine, closely spaced, retractively curved axial ribs, which are not quite as wide as the spaces that separate them. These riblets are very regular in strength and spacing. Suture rendered inconspicuous by the appressed whorl. Periphery well rounded, rendered angulated in appearance by the light peripheral zone. This, however, is an optical illusion. Base openly umbilicated, marked by the continuation of the axial riblets, which become strengthened on the umbilical wall. Aperture subcircular, produced into a weak auricle at the posterior angle; peristome simple, a little thicker on the inner lip than on the outer. Parietal wall covered by a thick callus. In this species the peristone is produced into an auricle constituting a slight channel. Operculum typically aperostomid, having 7 whorls.

The type, U.S.N.M. No. 20109, was collected by the Wilkes Exploring Expedition at Maguas, Peru. It has 4.4 whorls and measures: Height, 19.9 mm.; greater diameter, 37.4 mm.; lesser diameter, 26 mm. Height of aperture, 13.3 mm.; diameter, 17.3 mm.

U.S.N.M. No. 36942 contains two additional specimens from the same source.

The large aperture readily distinguishes this species from *A.* (*I.*) *nirafe.*

APEROSTOMA (INCIDOSTOMA) NIRAFE, new species

PLATE 27, FIGURES 23–25

Shell of medium size, depressed-helicoid, covered with a chestnut-brown periostracum on the upper surface. There is a very broad darker band immediately anterior to the periphery, which gradually fades into the basal color scheme. The nucleus consists of a little more than 2 small, well-rounded smooth whorls. The postnuclear whorls are well rounded, curving downward toward the suture and marked by irregular and irregularly depressed axial riblets, which vary both in strength and spacing. Suture deeply impressed. Periphery weakly angulated. Base openly umbilicated, strongly rounded, and marked by the continuation of the axial riblets, which become stronger and more distinct on the umbilical wall. Aperture almost circular, produced into an auricle at the posterior angle; peristome simple, the inner thickened; the outer thin and sharp. The last whorl descends below the periphery and so does the tip of the auricle.

The type, U.S.N.M. No. 380795, was collected by R. H. Palmer in a dense jungle 13 km. south of Puerta Santos, Province of Santander del Norte, Colombia. It has 4.5 whorls and measures: Height, 19.2 mm.; greater diameter, 36.5 mm.; lesser diameter, 25.6 mm. Height of aperture, 14.8 mm.; diameter, 15.8 mm.

This species recalls *A.* (*I.*) *hitomi* from Peru but has the axial ribs much less regular and the suture much more deeply channeled. The small aperture distinguishes it from *A.* (*I.*) *pizarroi.*

APEROSTOMA (INCIDOSTOMA) HITOMI, new species

Plate 27, Figures 26–28

Shell depressed-helicoid. The early denuded whorls are pale rose color; the last whorl is covered by a thin periostracum, which is pale olivaceous horn colored on the upper surface and a trifle darker on the base. It has a rather broad light zone immediately above the periphery and a dark zone a little narrower than the pale one below the periphery, the dark zone fading anteriorly into the general coloration of the base. The nucleus consists of about 2 whorls, small, well rounded, smooth. The postnuclear whorls are well rounded and marked by very regular, rather closely spaced, decidedly retractively curved axial riblets. The spaces that separate these riblets are about as wide as the riblets. On the upper surface near the aperture there are also some oblique scratches. The summit of the turns is appressed to the suture and creeps but slightly on the preceding turn; the suture therefore is not channeled. The periphery is well rounded; the white band, however, gives it the appearance of an angulation, which is an optical illusion. Base well rounded, moderately openly umbilicated, and marked by the continuation of the axial riblets, which become stronger on the umbilical wall. Aperture circular, produced into an auricle at the posterior angle; peristome simple, the inner lip thickened, the outer thin, except at the posterior angle, where it becomes thickened and bent inward over the aperture as a slight hood.

The type, U.S.N.M. No. 316105, was collected by Cuming at Quito, Ecuador. It has 4.7 whorls and measures: Height, 21.7 mm.; greater diameter, 39.2 mm.; lesser diameter, 27 mm. Height of aperture, 14.6 mm.; diameter, 17.0 mm.

This species in size resembles *A.* (*I.*) *pizarroi.* It has, however, a comparatively smaller aperture; it differs from *A.* (*I.*) *nirafe* in being larger and in having the axial riblets much more regular and closely spaced.

APEROSTOMA (INCIDOSTOMA) STIRLINGI, new species

PLATE 27, FIGURES 20–22

Shell helicoid, the upper surface very dark olive; below the periphery there is a broad, almost black band, which gradually fades into dark olive. This in turn becomes paler toward the umbilical wall. There is a pale zone immediately above the periphery. Interior of the aperture bluish white. The nucleus consists of 2 well-rounded smooth whorls. The postnuclear whorls are slightly flattened toward the suture; the rest are well rounded. The postnuclear whorls are marked by rather regular, slender, retractively curved riblets, which are about as wide as the spaces that separate them. Suture moderately impressed. The periphery appears to be weakly angulated, but this is an optical illusion owing to the light colored band. Base narrowly umbilicated for the group, marked by the continuation of the axial riblets, which gain slightly in strength on the umbilical wall. Aperture almost circular; peristome simple, the inner lip slightly thickened, the outer acute, drawn out into a slight auricle at the posterior angle. This protraction of the outer lip at the posterior auricle produces a ridge that extends back halfway over the whorl on the upper surface of the turn near the suture. Operculum typically aperostomid, showing 8 whorls.

The type, U.S.N.M. No. 516296, was collected by M. W. Stirling at Mendez, Upper Paute River, Ecuador. It has 4.4 whorls and measures: Height, 15.9 mm.; greater diameter, 25 mm.; lesser diameter, 17.9 mm. Height of aperture 11 mm.; diameter, 11.2 mm.

U.S.N.M. No. 426538 contains 17 topotypes from the same source.

The small size will readily distinguish this species from all the other Incidostomas.

Subgenus AUSTROCYCLOTUS Bartsch (antea, p. 132)

Aperostomine shells of helicoid shape, the outside surface of which is marked by closely placed threads crossing each other in protractive and retractive series, producing an engine-turned pattern.

Type: *Aperostoma* (*Austrocyclotus*) *stramineum* (Reeve).

Distribution: Panama to Ecuador and Venezuela and the West Indies.

According to Bland, the radula formula of *A.* (*Austrocyclotus*) *stramineum* (Reeve) is 3:3:3:2. The verge in *A.* (*A.*) *aulari* (H. B.

Baker) is situated on the back of the neck behind the tentacles and is traversed by a seminal groove and furnished with a very short appendage. An egg was found in the uterus of *A.* (*A.*) *stramineum* from near San Estaban, Carabobo, Venezuela. The shape of this was a slightly flattened sphere of about 2 mm. in diameter and 1.5 mm. from pole to pole. It had a heavy transparent leathery shell.

KEY TO THE MAINLAND SPECIES OF THE SUBGENUS AUSTROCYCLOTUS

Umbilicus narrow.	
Shell banded	granulatum
Shell not banded	limellum
Umbilicus not narrow.	
Umbilicus very broad	panamense
Umbilicus not very broad.	
Periphery marked by decidedly retractively curved cords	stramineum
Periphery not marked by decidedly retractively curved cords.	
Shell bicolor.	
Greater diameter more than 21 mm	aulari
Greater diameter less than 20 mm	glaucostomum
Shell not bicolor.	
Greater diameter more than 37 mm	peilei
Greater diameter less than 33 mm.	
Spiral sculpture of base strong	kugleri
Spiral sculpture of base not strong.	
Diameter more than 17 mm	carabobense
Diameter less than 14 mm	burringtoni

APEROSTOMA (AUSTROCYCLOTUS) GRANULATUM (Pfeiffer)

Plate 27, Figures 15–17

1862. *Cyclotus granulatus* Pfeiffer, Proc. Zool. Soc. London, 1862, p. 275.
1863. *Cyclotus granulatus* Reeve, Conchologia iconica, vol. 14, sp. 1.
1897. *Neocyclotus* (*Neocyclotus*) *granulatus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 137.
1923. *Poteria* (*Neocyclotus*) *granulatus* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 37.

Shell of medium size, helicoid, soiled white except the anterior half between summit and periphery and the posterior half of the base, which are dark chestnut-brown. The nucleus consists of 2 small, well-rounded, smooth turns; the post-nuclear whorls are flattened and slightly bent in toward the suture on the anterior third between the summit and the periphery. The rest are well rounded. They are marked by closely spaced axial threads, which cross each other in protracted and retracted series, forming low, more or less rounded nodules at their junction. Periphery well rounded. Base narrowly umbilicated, well-rounded and marked by the continuation of the sculpture mentioned for the spire. Here, however, the nodules are a little larger. Aperture circular; peristome thin on the outer and basal lip, somewhat thickened on the inner lip and parietal wall. Operculum typically australocyclotid, consisting of about 7 whorls.

The specimen figured, U.S.N.M. No. 307460, comes from Ecuador. It has 4.2 whorls and measures: Height, 16.5 mm.; greater diameter, 25.5 mm.; lesser diameter, 17.2 mm. Height of aperture, 12.2 mm.; diameter, 12.6 mm.

The following lots are also from Ecuador, without specific locality: U.S.N.M. No. 316108 contains 3 specimens; U.S.N.M. No. 315045, 1 specimen; U.S.N.M. No. 307418, 2 specimens.

The narrow umbilicus and the conspicuous banding will differentiate this from the other *Austrocyclotus.*

APEROSTOMA (AUSTROCYCLOTUS) LIMELLUM, new species

Plate 27, Figures 6–8

Shell of medium size, helicoid, almost subglobular, pale chestnut-brown, the last whorl a little paler than the rest, both on the spire and base. In addition to this there are obscure, rather broad axial bands of darker and lighter brown. The nucleus consists of 2 small, well-rounded, smooth whorls. The postnuclear whorls are appressed at the summit, well rounded, and marked by retractive and protractive axial riblets, the junctions of which form weak nodules which are more or less elongated. Suture inconspicuous. Periphery well rounded. Base narrowly umbilicated, strongly rounded, marked like the spire. Here the nodules are of about the same strength as on the spire. This sculpture also extends over the umbilical wall. Aperture subcircular, with a rather strong angulated auricle at the posterior angle of the aperture. Peristome thin on the outer lip and somewhat thickened and reflected on the inner lip.

The type, U.S.N.M. No. 515906, was collected by O. Haught in the Rio Cesar Valley, Magdalena, Colombia, at an altitude somewhere between 100 and 300 meters. It has a little more than 4 whorls and measures: Height, 17.5 mm.; greater diameter, 24 mm.; lesser diameter, 17.7 mm. Height of aperture, 12.8 mm.; diameter, 12.8 mm.

The narrow umbilicus and globular form readily distinguish this species from all the other *Austrocyclotus.*

APEROSTOMA (AUSTROCYCLOTUS) PANAMENSE (Da Costa)

Plate 27, Figures 3–5

1904. *Neocyclotus panamensis* Da Costa, Proc. Malac. Soc. London, vol. 6, p. 6, pl. 1, figs. 6–9.

1912. *Neocyclotus panamensis* Kobelt, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, pt. 3, p. 886, pl. 131, figs. 15–17.

1923. *Poteria* (*Neocyclotus*) *panamensis* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 37.

As we have not seen this species we give a translation of Da Costa's description and copy his figure.

Shell openly umbilicated, depressed, yellowish. Whorls 4.5, rounded, marked by incremental striae and obscure retuse corrugations. Peristome thin, simple, the margins joined by a callus. Operculum testaceous, closely wound with a threadlike carina at the suture, the middle concave. Altitude, 10 mm.; greater diameter, 15 mm.; lesser, 12 mm. [The aperture of Da Costa's figure gives the following measurements; Height, 6.6 mm.; diameter, 6.4 mm.]

Habitat: Chiriqui, western Panama.

The very broad umbilicus figured by Da Costa differentiates this from the other members of the group.

APEROSTOMA (AUSTROCYCLOTUS) STRAMINEUM (Reeve)

PLATE 27, FIGURES 9–11

1843. *Cyclostoma stramineum* REEVE, Proc. Zool. Soc. London, vol. 11, p. 46.

1843. *Cyclostoma stramineum* SOWERBY, Thesaurus conchyliorum, vol. 1, p. 93, pl. 29, figs. 211–212.

1852. *Cyclotus stramineus* PFEIFFER, Monographia pneumonopomorum viventium, vol. 1, p. 20.

1897. *Neocyclotus* (*Neocyclotus*) *stramineus* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 138.

1923. *Poteria* (*Neocyclotus*) *stramineus* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 37, pl. 5, figs. N, O.

Shell small, depressed-helicoid, unicolor, covered with a buff periostracum. The nucleus consists of 2 small, well-rounded, smooth turns. Postnuclear whorls inflated, strongly rounded, appressed at the summit and marked by numerous closely spaced axial riblets, which have a retractive and protractive arrangement, and the junction of which produces slender nodules, which increase in strength with the increase of the whorls. At the periphery these riblets have a decided retractive slant. On the last turn those near the suture are a little stronger and a little more protractively directed. Suture very narrowly impressed. Periphery well rounded. Base narrowly umbilicated, inflated, stongly rounded, and marked like the spire. This is also the sculpture of the umbilical wall. Aperture almost circular, protracted into a conspicuous angle at the posterior angle of the aperture; peristome thin on the outer lip, thickened on the inner lip. The parietal wall is covered by a thick callus, which is slightly separated from the preceding turn. Operculum typically aperostomid, concave in the middle, and having about 6 whorls.

The specimen figured is one of three, U.S.N.M. No. 316389. It has 4.3 whorls and measures: Height, 13.8 mm.; greater diameter, 20.8 mm.; lesser diameter, 15.1 mm. Height of aperture, 8.3 mm.; diameter, 9.9 mm. The type came from Merida, Venezuela.

There are six additional lots in the collection of the National Museum, as follows: U.S.N.M. No. 252579, 7 specimens from 6 miles west of Puerto Cabello, Venezuela; U.S.N.M. No. 99535, 1 specimen from Puerto Cabello; U.S.N.M. No. 339944, 1 specimen from Patanemo, near Puerto Cabello; U.S.N.M. No. 366506, 1 specimen from La Guayra, Venezuela; The following lots are labeled merely "Venezuela"; U.S.N.M. No. 356142, 3 specimens; U.S.N.M. No. 57767, 3 specimens.

The retractive slant of the riblets at the periphery and unicolor coloration distinguish this from all the medium-sized forms.

APEROSTOMA (AUSTROCYCLOTUS) AULARI (H. B. Baker)

PLATE 27, FIGURES 12–14

1923. *Poteria* (*Neocyclotus*) *glaucostoma aulari* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, pp. 37–38, pl. 5, figs. K, L, M.

Shell of medium size, helicoid, the early whorls pale orange-brown, the last olivaceous. At irregular intervals there are axial bands of brown, which give the shell a somewhat variegated pattern of coloration. The nucleus consists of 1.8 small, well-rounded, smooth turns; the postnuclear whorls are well rounded, bending downward into the suture and appressed to the summit, the appressed portion forming a slender raised thread, marked by the retractive and protractive ribbing characteristic of the group, which produces the usual granulated pattern. Suture well impressed. Periphery obsoletely angulated. Base moderately broadly umbilicated, well rounded, and marked with the sculpture of the spire, but here the granulation is a little more pronounced. The umbilical wall is free of granulation, and shows mere lines of growth. Aperture circular; peristome simple, that of the inner lip somewhat thickened and reflected; the outer sharp. There is a slight angulation at the posterior angle. Operculum typically aperostomid, having about 6 whorls.

The specimen figured, Acad. Nat. Sci. Philadelphia No. 140908, comes from the edge of the Cerritos de Yumarito, near Quebrado Seca, Estado Yaracuy, Venezuela. It measures: Height, 13.7 mm.; greater diameter, 21.0 mm.; lesser diameter, 15.2 mm.

In coloration this species reminds one of *A.* (*A.*) *limellum*, but it is easily differentiated from this by having a much broader umbilicus and in being less globular.

APEROSTOMA (AUSTROCYCLOTUS) GLAUCOSTOMUM (Pfeiffer)

PLATE 27, FIGURES 18–19

1855. *Cyclostoma* (*Cyclotus*) *glaucostomum* PFEIFFER, Proc. Zool. Soc. London, vol. 23, p. 103.

1858. *Cyclotus glaucostomus* PFEIFFER, Monographia pneumonopomorum viventium, vol. 2, p. 20.

1863. *Cyclotus glaucostoma* Reeve, Conchologica iconica, vol. 14, sp. 35.
1897. *Neocyclotus* (*Neocyclotus*) *glaucostomus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 137.
1923. *Poteria* (*Neocyclotus*) *glaucostoma glaucostoma* H. B. Baker, Occ. Pap., Mus. Zool. Univ. Michigan, No. 137, p. 38.

Shell umbilicated, depressed-subturbinate, solid, sculptured with irregular oblique plications and striations on the upper surface, shining, chestnut colored. Spire slightly conoid, apex obtuse, smooth. Whorls 4, convex, increasing rapidly in size, the last dilated anteriorly, slightly minutely malleatedly granulose. Umbilicus pervious, not equaling one-fourth the diameter of the shell. Aperture scarcely oblique, subrotund, bluish pearly within; peristome straight with a slight angle at the posterior angle. The inner lip somewhat thickened and arched. Altitude, 9 mm.; greater diameter, 18 mm.; lesser diameter, 14 mm.

Habitat: Venezuela.

As we have not seen this species, we give a translation of Pfeiffer's description and copy Reeve's figure.

We believe this species to be related to *A.* (*A.*) *aulari* (H. B. Baker), from which the lesser size will differentiate it.

APEROSTOMA (AUSTROCYCLOTUS) PEILEI (Gude)

Plate 27, Figures 1–2

1912. *Neocyclotus peilei* Gude, Proc. Malac. Soc. London, vol. 10, p. 22 (text fig.).
1912. *Neocyclotus peilei* Kobelt, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, pt. 3, p. 896, pl. 137, figs. 14–15.

We have not seen this species and so quote Gude's description and copy his figures:

"Shell somewhat narrowly umbilicated, depressed turbinate, more or less striated transversely, the striae being intersected by other striae descending obliquely forward, thus forming coarse granules arranged in quincunx, except in a few scattered places where a portion of either set of striae is continuous, in some instances even forming zigzag lines, while near the peristome the oblique striae tend to disappear and the granules become obsolete. Whorls 5, convex, increasing rather slowly at first, the last increasing rapidly, and dilated toward the mouth; earlier whorls pale, becoming gradually darker, last dark brown with blackish streaks at the lines of growth, descending slowly in front. Aperture circular, scarcely oblique; peristome simple, acute, slightly sinuate at the junction of the upper and columellar margins; operculum slightly concave. Diam. maj. 39.5, min. 30 mm.; alt. 30 mm.

"Type in the British Museum, presented by Major Peile.

"Its nearest ally appears to be *Neocyclotus Belli*, Beddome, but that species is considerably larger, and lacks the coarse granules so conspicuous a feature in the present species."

The type came from Colombia. Kobelt (*loc. cit.*) says "Alejandria near Medellín."

The extremely large size of this species readily distinguishes it from the other members of the subgenus.

APEROSTOMA (AUSTROCYCLOTUS) KUGLERI, new species

Plate 28, Figures 1–3

Shell helicoid, of pale brown color on the upper surface and buff on the lower. There are also present axial streaks of irregular width and spacing, of darker brown. The nucleus consists of 2 small, well-rounded, smooth turns; postnuclear whorls somewhat inflated, strongly rounded, appressed at the summit and marked near the summit by short axial rugae. Below this the usual sculpture of protractive and retractive closely spaced ribs is present, which gives to the surface a very regular granulated appearance. Suture well impressed. Periphery well rounded. Base openly umbilicated, somewhat inflated, well rounded, and marked like the spire, with the granulation extending over the edge of the umbilicus, but not over the entire surface. Aperture circular, with a slight auricle at the posterior angle; peristome simple, that of the inner lip much thickened and slightly reflected; the outer thin. The callus on the parietal wall shows a decided sinus near its junction with the columella. Operculum typically aperostomid, of about 6 whorls.

The type, U.S.N.M. No. 515924, was collected by Kugler at Riecito, District Acosta, Falcon, Venezuela.

U.S.N.M. No. 515925 contains 21 topotypes, which show some variation in size. The largest and smallest yield the following measurements: Height, 23.5 mm. and 16.8 mm.; greater diameter, 32.5 mm. and 24.6 mm., respectively.

In shape this species is nearest *A.* (*A.*) *limellum.* It lacks, however, the flattening near the summit of the whorls and is at once differentiated from it by the sinus in the callus of the parietal wall.

APEROSTOMA (AUSTROCYCLOTUS) CARABOBENSE, new species

Plate 28, Figures 4–6

Shell small, helicoid, covered with a thin, yellowish, straw-colored periostracum. The nucleus consists of 1.6 small, well-rounded, smooth turns, forming a rather elevated apex. The postnuclear whorls are decidedly inflated, well-rounded, slightly flattened at the summit and marked by numerous short rugae on the flattened portion of the summit, while the rest bear the usual retractive and protractive riblets resulting in the granulations characteristic of the group. Suture well impressed. Periphery obscurely angulated. Base narrowly umbilicated, inflated, and marked by the granular sculpture characteristic of the spire, which extends slightly over the umbilical edge but does not cover all of the umbilical wall. Aperture circular, with a slight angulation at the posterior angle; peristome simple, the inner slightly thickened and reflected; the outer sharp. The parietal wall is covered by a thin callus.

The type, U.S.N.M. No. 339947, was collected by H. Pittier at Guaremales, Venezuela. It has 4.2 whorls and measures: Height, 13.4 mm.; greater diameter, 18.0 mm.; lesser diameter, 13.3 mm. Height of aperture, 9.3 mm.; diameter, 8.8 mm.

The small size readily distinguishes this species from others of the subgenus except *A.* (*A.*) *burringtoni*, which is still smaller.

APEROSTOMA (AUSTROCYCLOTUS) BURRINGTONI, new species

PLATE 28, FIGURES 16–18

1923. *Poteria* (*Neocyclotus*) *granadensis rugata* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, pp. 36–37, pl. 5, figs. P, Q.

Shell very small, helicoid. Nuclear whorls pale reddish brown, the rest of the shell gradually fading to straw color on the last turn. The nucleus consists of 1.5 small, well-rounded, smooth turns; the postnuclear whorls are strongly rounded, somewhat flattened near the suture, and marked by rather regular axial riblets near the suture, which become wavy anteriorly, where they assume the granular sculpture characteristic of the group. Suture well impressed on the early whorls, less so on the last. Periphery well rounded. Base narrowly umbilicated, inflated, rounded, marked by the same type of sculpture as that which characterizes the spire. This, however, becomes enfeebled toward the umbilicus, which is free of granulation. Aperture circular, slightly angulated at the posterior angle; peristome simple; that of the inner lip somewhat thickened and reflected; the outer sharp. Operculum typically aperostomid, of about 4 whorls.

The type, Acad. Nat. Sci. Philadelphia No. 104625, is one of four specimens collected by S. Brown at Cariaquita, Venezuela. It has 3.9 whorls and measures: Height, 9.8 mm.; greater diameter, 13.4 mm.; lesser diameter, 9.7 mm. Height of aperture, 6.6 mm.; diameter, 6.3 mm.

The very small size of this species easily distinguishes it from all the other *Austrocyclotus*.

Subgenus NEOCYCLOTUS Fischer and Crosse

1886. *Neocyclotus* FISCHER and CROSSE, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, p. 148.
1910. *Neocyclotus* PILSBRY, Proc. Acad. Nat. Sci. Philadelphia, 1910, p. 533 (*Cyclostoma dysoni* Pfeiffer designated as type).

Aperostomid mollusks with helicoid, openly umbilicated shell, marked by anastomosing axial sculpture. Aperture with the outer peristome acute, the inner somewhat thickened, and the posterior angle slightly drawn out. Operculum covered on the outside with a thick calcareous deposit, which forms a weak ridge on the inner edge of the whorls and tapers outwardly, its surface being obliquely striated.

Type: *Aperostoma* (*Neocyclotus*) *dysoni* (Pfeiffer).

Distribution: Southeastern Mexico to Colombia.

A. (*N.*) *dysoni ambiguum* (v. Martens) yields the following data: Radula, 3 : 3 : 3 : 2. Jaw without distinct median projection. Penis typically aperostomid, situated on back of neck behind the tentacles with penal groove and short terminal appendage. The mollusk that we refer to as *A.* (*N.*) *dysoni hinkleyi* was said by Crosse and Fischer to have the radula formula 3 : 3 : 3 : 2.

KEY TO THE SPECIES OF SUBGENUS NEOCYCLOTUS[3]

Umbilicus narrow.
  Summit of whorls decidedly flattened---------------------------- wetmorei
  Summit of whorls not decidedly flattened------------------------- dysoni
Umbilicus wide.
  Umbilicus rapidly enlarged at last whorl.
    Suture of last whorl deeply channeled------------------ corpulentum
    Suture of last whorl not deeply channeled----------- sanctaemarthae
  Umbilicus not rapidly enlarged at last whorl; regularly increasing from apex-- chrysacme

APEROSTOMA (NEOCYCLOTUS) WETMOREI, new species

PLATE 41, FIGURES 13–15

Shell subglobular, covered with a dark olivaceous-brown periostracum, which is axially irregularly streaked with wood-brown lines. Interior of aperture bluish white, with a livid cast. Nuclear whorls decollated in all our specimens. The postnuclear whorls are strongly rounded and marked by retractively slanting, more or less interrupted axial riblets, which give an almost nodulose aspect to the surface of the shell. The axial elements are separated from the interspaces by a width about equaling them. Suture moderately well constricted. Periphery strongly rounded. Base inflated, strongly rounded, narrowly openly umbilicated. The posterior half is marked like the upper surface, while the anterior half has the riblets more irregular and less nodulose. On the umbilical wall the axial riblets become somewhat intensified both in strength and irregularity. Aperture subcircular, slightly auriculated posteriorly. Outer lip of the peristome thin, the inner slightly thickened. The parietal wall is covered by a moderately thick callus. Operculum typically neocyclotid.

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[3] We have not included *A.* (*N.*) *smithi* Pilsbry and Clapp in this key, as we have not seen specimens of it.

The type, U.S.N.M. No 536033, was collected by Dr. Alexander Wetmore and M. A. Carriker, Jr., at Tierra Nueva, Sierra Negros, Magdalena, Colombia. It has 3.4 whorls remaining and measures: Height, 22.6 mm.; greater diameter, 28.7 mm.; lesser diameter, 21.4 mm. Height of aperture, 15.4 mm.; diameter, 15.0 mm.

The jaw is typically aperostomid, and the radula has the formula 3:3:3:2.

U.S.N.M. No. 536034 contains six topotypes.

This species resembles *A.* (*N.*) *smithi* Pilsbry and Clapp, from which it can readily be distinguished by its very narrow umbilicus. From the *dysoni* group it can be distinguished by its broadly flattened shoulder at the summit.

APEROSTOMA (NEOCYCLOTUS) DYSONI (Pfeiffer)

Shell helicoid, varying greatly in size in the different races, covered with a thin periostracum, which varies materially in color in the different subspecies; it may be unicolor or bicolor, that is the base may be of a different shade from that of the spire. The nuclear turns are about 2, well rounded, smooth. The postnuclear whorls are well rounded and marked by vermiculations, which also vary greatly in strength in the different forms. The base is well rounded, openly umbilicated, the umbilication varying in width in the different races. The umbilical wall bears axial riblets that also vary in strength with the subspecies. Aperture almost circular; peristome simple, that of the inner lip usually thickened. Operculum typically neocyclotid.

The following key will help to differentiate the subspecies:

KEY TO THE SUBSPECIES OF APEROSTOMA (NEOCYCLOTUS) DYSONI

- Shell gigantic; greater diameter more than 33 mm______________________ dyeri
- Shell not gigantic; greater diameter less than 30 mm.
  - Axial sculpture rather strongly vermiculated.
    - Vermiculations fine and closely spaced.
      - Shell large; greater diameter more than 27 mm_________ hinkleyi
      - Shell small; greater diameter less than 22 mm_______ ruatanense
    - Vermiculations not fine or closely spaced.
      - Whorls somewhat flattened toward the summit.
        - Greater diameter more than 25 mm___________________ dysoni
        - Greater diameter less than 20 mm___________________ aureum
      - Whorls not flattened toward the summit.
        - Columellar tip thickened________________________ sumichrasti
        - Columellar tip not thickened__________________________ affine

- Axial sculpture not strongly vermiculated.
  - Axial ribs of penultimate whorl straight.
    - Sculpture rough and coarse____ ambiguum
    - Sculpture not rough or coarse.
      - Spiral bands present____ berendti
      - Spiral bands absent____ sallei
  - Axial ribs of penultimate whorl not straight.
    - Base bicolor____ valerioi
    - Base not bicolor.
      - Axial sculpture of umbilical wall very coarse____ nicaraguense
      - Axial sculpture of umbilical wall not coarse____ cookei

APEROSTOMA (NEOCYCLOTUS) DYSONI DYERI, new subspecies

PLATE 28, FIGURES 31–33

Shell gigantic for the species, helicoid, covered with an olivaceous-buff periostracum. When denuded the early whorls are rose red, the last soiled white; interior of aperture soiled white. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear turns are well rounded except near the summit, where they become flattened, almost forming a groove, but immediately at the summit they are again upturned and appressed to the preceding whorl. They are rather coarsely sculptured by irregular, wavy, anastomosing, retractively curved axial riblets. They are about as wide as the spaces that separate them. Suture slightly impressed. Periphery well rounded. Base narrowly, openly umbilicated, inflated, and marked by the same type of sculpture as that which characterizes the upper surface of the last whorl. This type of sculpture stops at the outer edge of the umbilicus; the latter shows only coarse riblike incremental lines. Aperture almost circular, drawn out into an obtuse angle at the posterior angle of the aperture; peristome simple, that of the outer lip thin, while the columellar peristome is thickened and shows lines of growth; the inner lip extends up over the parietal wall almost undiminished, leaving a channel between the preceding turn and its outer edge, which gives the last whorl a slightly solute aspect; however the whorl itself is not solute, for the apex of the projection at the posterior angle is adnate to the preceding turn. The operculum is typically neocyclotid.

The type U.S.N.M. No. 215592, was collected by F. J. Dyer at La Ceiba, Honduras. It has 4.7 whorls and measures: Height, 24.6 mm.; greater diameter, 33.3 mm.; lesser diameter, 23.3 mm. Height of aperture, 15.4 mm.; diameter, 16.8 mm.

The following topotypes are also in the collection of the National Museum: No. 322333, 3 specimens; No. 424545, 10 specimens, and No. 404673, 2 specimens.

The large size of this subspecies readily differentiates it from the other subspecies of this group.

APEROSTOMA (NEOCYCLOTUS) DYSONI HINKLEYI, new subspecies

PLATE 28, FIGURES 19–21

Shell rather large, helicoid, covered with a brownish-olivaceous periostracum. The anterior two-fifths of the base and umbilical wall, however, is paler than the rest of the base, and this gives to the base a bicolor effect. When denuded all the whorls are soiled flesh colored; interior of aperture bluish white. The nucleus consists of a little more than 2 small, well-rounded, smooth turns. The postnuclear whorls are well rounded except at the suture, where on the last whorl there is a decided groove a little below the summit; the summit itself is again elevated and appressed to the preceding turn. The postnuclear whorls are marked by strong, retractively curved, anastomosing, irregularly wavy riblets, which are as wide as the spaces that separate them. These riblets are rather fine compared with most of the members of the genus, and closely spaced. Suture well impressed. Periphery well rounded. Base inflated, strongly rounded, openly umbilicated, the width of the umbilicus being about one-fifth of the diameter of the shell. The base is marked by the continuation of the sculpture, which characterizes the upper surface of the last turn. The umbilical wall, however, has only riblike incremental elements, which extend upon the base slightly beyond the outer edge of the umbilicus. Aperture almost circular, slightly drawn out at the junction of the outer and basal lip and provided with a slender auricle at the posterior angle; peristome simple; the outer lip sharp, the inner thickened and somewhat reflected, extending up over the parietal wall almost undiminished to the posterior angle. The space between the peristome of the parietal wall and the preceding whorl is an impressed groove, which gives the impression of the last whorl being slightly solute. This, however, is not the case, for the tip of the little auricle is appressed to the preceding turn. The parietal callus forms a concave sinus as it slopes toward the columella. Operculum typically neocyclotid.

The type, U.S.N.M. No. 523968, was collected by F. Sarg in Guatemala. It has 4.4 whorls and measures: Height, 19.7 mm.; greater diameter, 28.3 mm.; lesser diameter, 18.4 mm. Height of aperture, 14.2 mm.; diameter, 14.6 mm.

U.S.N.M. No. 32056 contains two topotypes.

In addition to these there are eight lots in the collection of the United States National Museum, all from Guatemala, as follows: No. 426003, 2 specimens from Cacao Finca, Trece Aguas, near Senahu, Alta Vera Paz; No. 365367, 1 specimen from Chama, Alta Vera Paz; No. 365666, 2 specimens from Chama, Alta Vera Paz; No. 226026, 2 specimens from Cacao; No. 425985, 3 specimens from the vicinity of Secanquim, Alta Vera Paz, at an altitude of 550 meters; No. 185498, 3 specimens from the vicinity of Secanquim, Alta Vera Paz No. 271019, 5 specimens from Myra Farm, Quirigua; No. 250694, 3 specimens from Finca de Providencia.

The following four are without specific locality: U.S.N.M. No. 57769, 4 specimens; U.S.N.M. No. 162314, 8 specimens; U.S.N.M. No. 316392, 2 specimens, and U.S.N.M. No. 316390, 2 specimens.

This subspecies shares with *A.* (*N.*) *dysoni ruatanense* the fine, closely spaced vermiculation and the bicolor base, but it differs from it in being much larger.

APEROSTOMA (NEOCYCLOTUS) DYSONI RUATANENSE, new subspecies

PLATE 28, FIGURES 7–9

Shell moderately large, helicoid, covered with a dark straw-colored periostracum; when denuded, soiled white. The nucleus consists of 2 small, well-rounded smooth turns. The postnuclear whorls are strongly rounded, slightly bent in toward the suture at the summit, and marked by strong axial anastomosing retractively curved vermiculations, which are separated by spaces about as wide as the riblets. Suture strongly impressed. Periphery well rounded. Base narrowly openly umbilicated, somewhat inflated, well rounded, and marked like the spire, except the umbilical wall, which is marked by riblike incremental elements. Aperture circular, except a slight angulation at the posterior angle; peristome simple, thin on the outer lip and thickened on the columellar side. A strong callus covers the parietal wall. There is a groove between this callus and the preceding turn, which gives the peristome a complete aspect. An oval incised sinus is present on the parietal wall. Operculum typically neocyclotid.

The type, U.S.N.M. No. 364702, was collected by F. J. Dyer on Ruatan Island, Honduras. It has 4.2 whorls and measures: Height, 13.3 mm.; greater diameter, 19.7 mm.; lesser diameter, 14 mm. Height of aperture, 9.6 mm.; diameter, 9.5 mm.

This race resembles *A.* (*N.*) *dysoni hinkleyi* in sculpture and in the bicolor basal coloration but is easily distinguished from this by lacking the impressed groove below the summit and by its much smaller size.

APEROSTOMA (NEOCYCLOTUS) DYSONI DYSONI (Pfeiffer)

PLATE 28, FIGURES 28–30

1851. *Cyclostoma dysoni* PFEIFFER, Proc. Zool. Soc. London, vol, 19, p. 243.

1852. *Cyclophorus dysoni* PFEIFFER, Monographia pneumonopomorum viventium, vol. 1, p. 98.

1853. *Cyclostoma dysoni* PFEIFFER, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 259, pl. 35, figs 5–6.

1858. *Cyclotus dysoni* PFEIFFER, Monographia pneumonopomorum viventium, vol. 2, p. 19.

1860. *Platystoma* (*Aperostoma*) *dysoni* MÖRCH, Malak. Blätter, vol. 7, p. 66.

1888. *Neocyclotus dysoni* FISCHER and CROSSE, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, p. 164, in part.

1890. *Cyclotus* (*Aperostoma*) *dysoni* VON MARTENS, Biologia Centrali-Americana, p. 3, in part.

1923. *Poteria* (*Neocyclotus*) *dysoni* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 33.

Shell rather large, helicoid, covered by an olivaceous straw-colored periostracum, in which the last whorl has an orange tinge. The anterior half of the base has a paler coloration than the posterior half, which gives this a bicolor aspect; interior of the aperture bluish white. When denuded the shell is soiled white. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are well rounded; the last one has an impressed groove a little below the summit, which is upturned and appressed to the preceding turn almost forming a cord. The postnuclear whorls are marked by rather coarse, vermiculated, slightly retractively slanting riblets, which are about as wide as the spaces that separate them. Suture well marked. Periphery well rounded. Base openly umbilicated, inflated, well rounded, and marked by the continuation of the sculpture that characterizes the upper surface of the last whorl, except the umbilical wall, which is marked only by riblike incremental lines. Aperture circular, except the slightly drawn-out angle at the posterior angle; peristome simple, that of the outer lip thin; the inner somewhat thickened. The parietal wall is covered by a thick callus, which continues the columellar lip to the posterior angle. There is a deep impressed line behind the parietal callus, which is slightly lunately incised. The operculum is typically neocyclotid.

The specimen described and figured is one of two, U.S.N.M. No. 321029, received from Sowerby and Fulton and labeled "Honduras." It has 4.5 whorls and measures: Height, 18.7 mm.; greater diameter, 25.9 mm.; lesser diameter, 18 mm. Height of aperture, 13 mm.; diameter, 13 mm.

U.S.N.M. No. 316388 contains two specimens received from Cuming from Honduras; U.S.N.M. No. 321025, three specimens collected by C. T. Simpson in Spanish Honduras.

This subspecies most closely resembles *A.* (*N.*) *dysoni aureum*. Like *aureum*, it does not have the axial riblets fine or closely spaced, and like it it has the whorls somewhat flattened toward the summit, but it is easily distinguished from *aureum* by its much larger size, exceeding 25 mm. in greater diameter, while *aureum* has less than 20 mm.

APEROSTOMA (NEOCYCLOTUS) DYSONI AUREUM, new subspecies

PLATE 28, FIGURES 13–15

1886. *Neocyclotus dysoni* FISCHER and CROSSE (part), Mission scientifique au mexique et dans l'Amérique centrale, vol. 2, pt. 7, pl. 39, fig. 10.

Shell small, helicoid, covered with a golden straw-colored periostracum. When denuded, soiled white; interior of aperture bluish white. The nucleus consists of almost 2 small, well-rounded, smooth turns. The postnuclear whorls are strongly rounded, slightly flattened below the suture on the last whorl and marked by decidedly retractively curved vermiculations, which are rather distantly spaced. Suture strongly impressed. Periphery well rounded. Base narrowly openly umbilicated, inflated, strongly rounded, and marked by the continuation of the same type of sculpture as that characterizing the upper surface of the last whorl, except the umbilical wall, which is marked by riblike incremental lines only. Aperture rather small, almost circular, slightly angulated at the posterior angle; peristome thin on the outer lip, somewhat thickened on the inner lip, with a strong callus covering the parietal wall, which is slightly emarginate. Operculum typically neocyclotid.

The type, U.S.N.M. No. 523970, comes from Panistlahuaca, Oaxaca, Mexico. It has 4.2 whorls and measures: Height, 14.2 mm.; greater diameter, 18.6 mm.; lesser diameter, 13.7 mm. Height of aperture, 8.7 mm.; diameter, 9.4 mm.

U.S.N.M. No. 320656 contains three topotypes.

This subspecies resembles *A.* (*N.*) *dysoni dysoni* (Pfeiffer) in having the vermiculations not fine or closely spaced but is easily distinguished from it by its coloration and by being much smaller. The greater diameter is less than 20 mm., while in *dysoni* it is more than 25 mm.

APEROSTOMA (NEOCYCLOTUS) DYSONI SUMICHRASTI, new subspecies

PLATE 28, FIGURES 25–27

Shell helicoid. Nuclear whorls eroded in all our specimens. Postnuclear whorls strongly rounded, with a depressed slight groove a little anterior to the summit of the last whorl. The summit itself is appressed to the preceding turn. The whorls are marked by retractively slanting anastomosing axial riblets, which are rather strong and separated by spaces a little wider than the riblets. Suture well impressed. Periphery well rounded. Base narrowly, openly umbilicated, inflated. strongly rounded and marked like the upper surface of the last whorl, except the umbilical wall, which is marked by strong riblike incremental elements. Aperture large, subcircular, with a rather conspicuous angulation at the posterior angle, which bears a slight groove in the middle; peristome simple, outer lip thin; the inner thickened and very strongly arched, forming a decidedly sigmoid line with the callus of the parietal wall. The parietal callus is thick and separated from the preceding whorl by a stronger impressed line. Operculum typically neocyclotid.

The type, U.S.N.M. No. 523674, was collected by F. E. Sumichrast in Chontales Forest, Nicaragua. It has 3.2 whorls remaining and measures: Height, 17.4 mm.; greater diameter, 23.5 mm.; lesser diameter, 16.3 mm. Height of aperture, 12 mm.; diameter, 13.1 mm.

U.S.N.M. No. 24023 contains 2 topotypes.

In size and sculpture this subspecies recalls *A.* (*N.*) *dysoni affine* (v. Martens), from which it can be distinguished by its more thickened inner lip, which is also more incised on the parietal wall. The posterior angle of the aperture is also much more strongly angulated and the aperture is not quite so wide.

APEROSTOMA (NEOCYCLOTUS) DYSONI AFFINE (von Martens)

PLATE 28, FIGURES 22–24

1890. *Cyclotus* (*Aperostoma*) *dysoni affinis* VON MARTENS, Biologia Centrali-Americana, p. 4, pl. 1, fig. 1.

1897. *Neocyclotus* (*Neocyclotus*) *dysoni affinis* KOBELT and MÖLLENDORFF, Nachrbl. deutschen malak. Ges., vol. 29, p. 137.

1923. *Poteria* (*Neocyclotus*) *dysoni affinis* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 34.

Shell rather large, helicoid, rather thin, covered with an olivaceous straw-colored periostracum; the anterior half of the base is a little paler than the rest. The denuded early whorls are of livid color; the later turns, when denuded, are soiled white. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are strongly rounded, except the last, which has an impressed groove a little below the summit while at the summit it is appressed to the preceding turn. The postnuclear whorls are marked by vermiculated, retractively slanting axial riblets, which are a little more distantly spaced than the spaces that separate them. Suture well impressed. Periphery well rounded. Base narrowly umbilicated, marked on the posterior half by the sculpture corresponding to that of the upper surface of the last turn. The anterior half and umbilical wall are marked by rather coarse, rather riblike incremental elements. Aperture subcircular; peristome simple, rather effuse on the outer lip, not greatly thickened on the inner lip. The parietal wall is covered by a moderately thick callus. The junctions of the parietal wall and the outer lip form a slight angle at the posterior angle of the aperture. Operculum typically neocyclotid.

The specimen described and figured is one of five, U.S.N.M. No. 228661, collected by August Busck in Panama. It has 4.4 whorls and measures: Height, 18.7 mm.; greater diameter, 25.8 mm.; lesser diameter, 17.7 mm. Height of aperture, 12 mm.; diameter, 13 mm.

This subspecies resembles *A.* (*N.*) *dysoni sumichrasti* but is larger, with a thinner, less effuse columellar lip and a more effuse outer lip. The posterior angle of the aperture also is less strongly produced.

APEROSTOMA (NEOCYCLOTUS) DYSONI AMBIGUUM (von Martens)

PLATE 28, FIGURES 10–12

1890. *Cyclotus* (*Aperostoma*) *dysoni ambiguus* VON MARTENS, Biologia Centrali-Americana, p. 4.

1897. *Neocyclotus* (*Neocyclotus*) *dysoni ambiguus* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

1923. *Poteria* (*Neocyclotus*) *dysoni ambiguus* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 34.

Shell moderately large, helicoid, covered with an olivaceous straw-colored periostracum. The nucleus consists of 2 well-rounded, smooth turns. The postnuclear whorls are inflated, strongly, evenly rounded, not flattened at the summit. The riblets on the penultimate whorl are straight and retractively curved; on the last whorl, the last half of which is very short, rough, and coarse, the axial sculpture assumes a vermiculated form separated by spaces a little wider than the ribs. Suture rendered strongly impressed by the slightly inbent summit of the turns. Periphery well rounded. Base quite narrowly umbilicated, strongly inflated and rounded. The posterior half is marked like the upper surface of the last turn; the anterior half is marked by very rough, riblike, flattened incremental elements. Aperture subcircular, slightly protracted at the posterior angle; peristome simple, the outer lip thin, the inner lip a little expanded and a little reflected near the umbilicus. The parietal wall is covered by a modrately thick callus. Operculum typically neocyclotid.

The specimen described and figured is one of two, U.S.N.M. No. 56966, collected by the Mexican Geographical Commission at Jalapa, Veracruz, Mexico. It has 4.3 whorls and measures: Height, 16.7 mm.; greater diameter, 22.9 mm.; lesser diameter, 16.3 mm. Height of aperture, 11 mm.; diameter, 11.5 mm.

Three additional lots are in the collection of the National Museum: No. 58314, one specimen from Actopan, Veracruz, collected by the Mexican Geographical Commission; the other two lots are labeled "Mexico," without specific locality. One of these, No. 321009, contains one specimen collected by Sallé; the other, No. 321026, contains two specimens from the Redfield collection.

This subspecies recalls *A.* (*N.*) *dysoni berendti* (Pfeiffer) but can readily be differentiated by its larger size and the absence of spiral markings.

APEROSTOMA (NEOCYCLOTUS) DYSONI BERENDTI (Pfeiffer)

PLATE 29, FIGURES 4–6

1861. *Cyclotus* (*?*) *berendti* PFEIFFER, Malak. Blätter, vol. 8, p. 171.

1863. *Cyclotus berendti* PFEIFFER, Nov. Conch., vol. 2, p. 232, pl. 59, figs. 22–23.

1886. *Neocyclotus berendti* FISCHER and CROSSE, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, pl. 38, figs. 4–5.

1888. *Neocyclotus berendti* FISCHER and CROSSE, *ibid.*, vol. 2, pt. 7, p. 167.

1890. *Cyclotus* (*Aperostoma*) *dysoni berendti* VON MARTENS, Biologia Centrali-Americana, Moll., p. 5.

1891. *Cyclotus dysoni* form *multilineatus* PILSBRY, Proc. Acad. Nat. Sci. Philadelphia, 1891, p. 325.

1923. *Poteria* (*Neocyclotus*) *berendti* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 33.

Shell depressed, somewhat helicoid, covered with an olivaceous straw-colored periostracum showing spiral white lines. The nucleus consists of 2.2 small, rounded, smooth turns. The postnuclear whorls are strongly rounded, appressed at the summit, and marked on the penultimate whorl by straight, retractively curved axial riblets, which here are about as wide as the spaces that separate them. On the last turn the axial sculpture becomes vermiculated with a retractive slant. The axial sculpture is not strong. Suture rendered strongly impressed by the inbent summit of the whorls. Periphery well rounded. Base narrowly openly umbilicated, inflated, rounded, with the axial sculpture characteristic of the upper surface of the last turn, bending over the posterior half of the base, gradually fading toward its center. The anterior half and the umbilical wall are marked by strong, riblike, incremental elements. Aperture subcircular, with a slight angulation at the posterior angle; outer lip thin, effuse; the inner lip much less strongly curved than the outer and somewhat thickened. The parietal wall is rendered complete by the continuation of the peristome from the columella to the posterior angle. This renders the last whorl slightly solute; in some specimens decidedly so. The parietal callus is ovally incised. Operculum typically neocyclotid.

The specimen described and figured is one of 10, U.S.N.M. No. 251715, collected by Nelson and Goldman at Chichen Itza, Yucatan. It has 4.3 whorls and measures: Height, 13.5 mm.; greater diameter, 19.6 mm.; lesser diameter, 14 mm. Height of aperture, 8.3 mm.; diameter, 9.2 mm.

U.S.N.M. No. 467450 contains four additional specimens from the same locality, while U.S.N.M. No. 424551 contains 45 specimens in various stages of growth from the same locality collected by Mr. and Mrs. Walter M. Gilbert, U.S.N.M. No. 162495 contains one specimen received from H. von Ihering labeled "Yucatan"; U.S.N.M.

No. 251716, seven specimens collected by Nelson and Goldman at Campeche, Campeche, Mexico.

The partially solute last turn, somewhat depressed spire, and spiral lines will differentiate this from the other subspecies.

APEROSTOMA (NEOCYCLOTUS) DYSONI SALLEI, new name

PLATE 29, FIGURES 7–9

1890. *Cyclotus* (*Aperostoma*) *dysoni minor* VON MARTENS, Biologia Centrali-Americana, pl. 1, fig. 2 (not *Cyclotus corrugatior minor* Chitty, 1857).

1923. *Poteria* (*Neocyclotus*) *dysoni minor* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 33.

Shell very small, helicoid, the early whorls pale pinkish, the later darker pink, and the last olive colored with axial darker streaks; interior of the aperture bluish white. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are somewhat inflated, strongly rounded; the penultimate one marked by very regular, retractively slanting axial riblets, which are as wide as the spaces that separate them. On the last turn these riblets become enfeebled and vermiculated and a little more distantly spaced. Suture strongly impressed. Periphery well rounded. Base narrowly openly umbilicated, inflated, well rounded, and marked on the posterior half by the weak continuation of the sculpture characterizing the upper surface of the last whorl. The umbilical wall shows mere incremental lines. Aperture subcircular; peristome thin, the outer effuse at the junction of the basal and outer lip; the inner strongly curved and somewhat thickened. The parietal wall is covered by a moderately thick callus. There is an oval concave flexure extending from the posterior angle to the columella. Operculum typically neocyclotid.

The specimen described and figured is one of two, U.S.N.M. No. 151376, collected by Sallé in Yucatan. It has 4 whorls and measures: Height, 11 mm.; greater diameter, 14.9 mm.; lesser diameter, 10.9 mm. Height of aperture, 7 mm.; diameter, 7.2 mm.

U.S.N.M. No. 68008 contains another specimen without specific locality.

Its small size will readily differentiate this from all the other races.

APEROSTOMA (NEOCYCLOTUS) DYSONI VALERIOI, new subspecies

PLATE 29, FIGURES 19–21

Shell rather large, helicoid, all but the last whorl pale rose colored; the last whorl pale olive with the anterior half of the base lighter. There are also axial streaks of dark olive. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are somewhat inflated, well rounded. The penultimate whorl is marked by somewhat wavy, retractively slanting axial ribs; the waviness and vermiculations of these become intensified on the last turn, the last part of which is very rough and irregular in sculpture. The last whorl rounds evenly toward the summit, leaving, however, a narrow, somewhat thickened, rounded cord near the suture. Suture well impressed. Periphery well rounded. Base narrowly openly umbilicated, inflated, well rounded and marked by the continuation of the sculpture, which characterizes the upper surface of the last whorl, except the umbilical wall, in which the vermiculations are not present, and which is marked by moderately rough riblike incremental elements. Aperture very broadly pear-shaped, produced at the posterior angle; peristome simple, the outer lip slightly thickened; the inner a trifle more so. The parietal wall is covered by a callus as thick as the columellar lip, and separated from the preceding turn by a well-impressed groove. Operculum typically neocyclotid.

The type, U.S.N.M. No. 524003, was received from M. Valerio and comes from an elevation of 1,480 meters at Cervantes, Costa Rica. It has 4.7 whorls and measures: Height, 20 mm.; greater diameter, 26 mm.; lesser diameter, 18 mm. Height of aperture, 12.5 mm.; diameter, 12.9 mm.

U.S.N.M. No. 525005 contains three topotypes from the same source.

This subspecies has the axial ribs of the penultimate whorl vermiculated and the base bicolor, characters that differentiate it from *A.* (*N.*) *nicaraguense*, in which the base is not bicolor. *A.* (*N.*) *nicaraguense* also is smaller.

APEROSTOMA (NEOCYCLOTUS) DYSONI NICARAGUENSE, new subspecies

PLATE 29, FIGURES 16–18

Shell of medium size, helicoid, covered by a pale olivaceous periostracum, with the early whorls pinkish. The nucleus consists of 2 small well-rounded whorls. The postnuclear whorls are strongly rounded; the penultimate one is marked by wavy axial riblets, which are a little narrower than the spaces that separate them. The last whorl is marked by feeble, more wavy, slightly vermiculated axial riblets, which grow irregular on the last portion of this turn. There is a slight impressed area a little below the summit, which is tumid. Suture strongly impressed. Periphery well rounded. Base quite narrowly umbilicated, inflated, strongly rounded, and marked by the continuation of the sculpture, which characterizes the upper surface of the last turn and which extends to the umbilical wall. The umbilical wall is marked by irregular low riblike incremental lines. Aperture very broadly ovate, slightly angulated at the posterior angle; peristome simple, both the outer and inner lips somewhat thickened. The parietal wall is covered by a heavy callus, which renders the peristome complete. There is a slight impressed line between this callus and the preceding turn. Operculum typically neocyclotid.

The type, U.S.N.M. No. 524005, comes from Polvon, Nicaragua. It has 4.7 whorls and measures: Height, 16.5 mm.; greater diameter, 21.1 mm.; lesser diameter, 15.1 mm. Height of aperture, 10.8 mm.; diameter, 10.6 mm.

U.S.N.M. No. 408779 contains 17 topotypes. U.S.N.M. No. 36863 contains 20 specimens collected by Dr. Flint in Nicaragua. U.S.N.M. No. 347613, 1 specimen from Dirio, Nicaragua.

The following four lots came from Nicaragua without specific locality: U.S.N.M. No. 43478, 3 specimens; U.S.N.M. No. 21729, 1 specimen; U.S.N.M. No. 57770, 3 specimens; and U.S.N.M. No. 11249, 2 specimens.

This subspecies, while related to *A.* (*N.*) *dysoni valerioi*, can readily be distinguished from it by not having the base bicolor.

APEROSTOMA (NEOCYCLOTUS) DYSONI COOKEI, new subspecies

PLATE 29, FIGURES 10–12

Shell rather small, helicoid. The first whorl pale flesh colored; all but the last of the succeeding turns rose-red; the latter bright olive or pale chestnut-brown. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are strongly rounded. The penultimate turn is marked by wavy axial riblets, which are not quite so wide as the spaces that separate them. On the last whorl these riblets become more wavy, slightly vermiculated, and less strongly developed, becoming evanescent on the last portion of the turn. Suture rather strongly impressed. Periphery well rounded. Base narrowly umbilicated, inflated, marked by the same sculpture found on the upper surface of the last whorl, except on the umbilical wall, which shows feeble riblike incremental lines. Aperture subcircular, with an angulation at the posterior angle, somewhat effuse at the junction of the basal and outer lip; peristome simple, the outer thin; the inner slightly thickened and a little more curved than the outer. The parietal wall with a moderately thick callus. Operculum typically neocyclotid.

The type, U.S.N.M. No. 524006, was collected by C. Wythe Cooke, for whom the species is named, at Uaxactun, Peten Province, Guatemala. It has 4.3 whorls and measures: Height, 12.6 mm.; greater diameter, 16.8 mm.; lesser diameter, 12 mm. Height of aperture, 8.3 mm.; diameter, 8.2 mm.

U.S.N.M. No. 382745 contains 140 topotypes representing various stages of development which show great variation in size. The extremes are represented by the following figures: The smallest has 3.7

whorls and measures: Height, 7.6 mm.; greater diameter, 15 mm.; lesser diameter, 8 mm. Height of aperture, 5.1 mm.; diameter, 5.5 mm. The largest specimen has 4.2 whorls and measures: Height, 14.1 mm.; greater diameter, 19.6 mm.; lesser diameter, 14.6 mm. Height of aperture, 8.9 mm.; diameter, 9.5 mm.

This species is quite widely distributed; we have it from the following Guatemalan stations: U.S.N.M. No. 377979, 1 specimen collected by H. F. Loomis at Uaxactun, Peten Province; U.S.N.M. No. 302030, 42 specimens collected by W. Popenoe at Magalango; U.S.N.M. No. 423977, 7 specimens collected by H. van der Schalie 1¼ miles south of Flores, Peten Province; U.S.N.M. No. 423978, 5 specimens collected by van der Schalie 2 km. south of Puebla Nueva, Peten Province; U.S.N.M. No. 423976, 6 specimens collected by van der Schalie 2 km. south of Puebla Nueva, Peten Province; U.S.N.M. No. 484860, 1 specimen collected by O. F. Cook at Cacao.

In addition to these, there are 10 lots of this subspecies from British Honduras, as follows: U.S.N.M. No. 251123, 1 specimen from near Punta Gorda, 7 miles west of the Caribbean Sea, collected by J. Lyman; U.S.N.M. No. 382737, 33 specimens collected by C. Wythe Cooke at El Cayo, 1 mile on the Benque Viejo road; U.S.N.M. No. 382738, 37 specimens collected by C. Wythe Cooke at the foot of a limestone hill, left bank of the Belize River 1½ miles above El Cayo; U.S.N.M. No. 382714, 36 specimens collected west of Gales Point by C. Wythe Cooke; U.S.N.M. No. 193013, 2 specimens from the Cayo District collected by W. A. Stanton.

Several others do not have specific localities but are labeled merely "Honduras." These are: U.S.N.M. No. 356080, 4 specimens collected by J. H. Campbell; U.S.N.M. No. 316388, 1 specimen; U.S.N.M. No. 150728, 6 specimens collected by Ingersoll; U.S.N.M. No. 150734, 1 specimen collected by W. A. Stanton; U.S.N.M. No. 20111, 1 specimen collected by Dyson.

This subspecies is nearest related to *A.* (*N.*) *nicaraguense*, but differs from it in having the axial sculpture within the umbilicus much more feebly developed, as well as in being much smaller.

APEROSTOMA (NEOCYCLOTUS) SMITHI Pilsbry and Clapp

PLATE 30, FIGURES 22, 27

1902. *Aperostoma smithi* PILSBRY and CLAPP, Nautilus, vol. 15, pp, 135–136, pl. 7, figs. 5, 8.

1923. *Poteria* (*Neocyclotus*) *smithi* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 33.

We have not seen specimens of this species and copy Pilsbry and Clapp's description and figure:

"Shell rather narrowly, deeply umbilicate, low-turbinate, very dark chestnut with indistinct wide, black streaks, the eroded inner whorls dull red; moderately solid. Surface glossy, with sculpture of close rib-striae, which are a little waved or crimped. Whorls fully 4, convex, rapidly widening. Aperture large, moderately oblique, circular, a trifle angular above. Peristome blunt, continuous, in contact with the preceding whorl for a short distance only. Umbilicus deep, its diameter contained 9 or 10 times in that of the shell.

"Alt. 14, diam. 20 mm.; length of aperture 10.5, width 10 mm.

"Alt. 14.5, diam. 19.5 mm.; length of aperture 10.8, width 10 mm. Operculum whitish externally, composed of about 6 flat whorls around a sunken, corneous nucleus about 1 mm. diam. Internally there is a slight central mucro, which lies just within the edge of the dull scar of attachment. Diam. 9 mm.

"Santa Marta Mts. at El Libano [Colombia], at 6,500 feet elevation, under decaying leaves in forest.

"It is about the size of *A. dysoni*, but with stronger, straighter rib-striae and slightly more oblique aperture. *A. pazi* Crosse is somewhat similar, but has a wider umbilicus, smaller aperture and is more depressed. *A. smithi* has a much smaller umbilicus than *A. sanctaemarthae* at any stage of growth; the aperture is larger and more oblique, the color is darker, and the operculum differs. This species is respectfully dedicated to Mr. H. H. Smith."

APEROSTOMA (NEOCYCLOTUS) CORPULENTUM (E. A. Smith)

PLATE 29, FIGURES 1–3

1878. *Cyclotus corpulentus* E. A. SMITH, Ann. Mag. Nat. Hist., ser. 5, vol. 2, p. 482.
1897. *Neocyclotus* (*Neocyclotus*) *corpulentus* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 137.
1923. *Poteria* (*Neocyclotus*) *corpulentus* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 43.

Shell helicoid, covered with a bright chestnut-brown periostracum, which is of about the same shade on the spire and base; interior of aperture pale buff. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are strongly rounded and marked by weak, slender, wavy, somewhat vermiculated axial riblets, which become decidedly reduced on the last portion of the last turn. Suture profoundly broadly channeled. Periphery well rounded. Base narrowly umbilicated, inflated, strongly rounded, and marked by the continuation of the axial riblets, which pass over the umbilical wall. Aperture very large, almost circular, slightly flattened toward the base and weakly angulated at the posterior angle; peristome simple; outer lip thin; inner lip thickened. The parietal wall is covered by a thick callus, which is separated from the preceding turn by a slender groove which renders the peritreme complete. Operculum typically neocyclotid, having 7 whorls.

The specimen described and figured, U.S.N.M. No. 192951, was collected by H. Pittier in the Rio Frio Basin, Sierra Nevada de Santa Martha Mountains, at an altitude of 1,200 meters, San Andres, Colombia. It has 4.5 whorls and measures: Height, 20.1 mm.; greater diameter, 31 mm.; lesser diameter, 20 mm. Height of aperture, 14.6 mm.; diameter, 14.9 mm.

This species resembles *A.* (*N.*) *sanctaemarthae* Pilsbry and Clapp, from which it can be distinguished readily, however, by its exceedingly deeply and broadly channeled suture and by its larger aperture.

APEROSTOMA (NEOCYCLOTUS) SANCTAEMARTHAE Pilsbry and Clapp

Plate 29, Figures 22–24

1902. *Aperostoma sanctaemarthae* Pilsbry and Clapp, Nautilus, vol. 15, pp. 134–135, pl. 7, figs. 9–10.

1923. *Poteria* (*Neocyclotus*) *sanctaemarthae* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 43.

Shell helicoid, covered with a broad, rather dark chestnut-brown periostracum; interior of aperture pale buff with a bluish tinge. The nucleus consists of 2 moderately large, well-rounded, smooth turns. The postnuclear whorls are well rounded and marked by slender, wavy, somewhat vermiculated, retractively curved axial ribs. Suture strongly impressed, with a slight narrow channel on the last quarter of the last turn. Periphery strongly rounded. Base narrowly umbilicated, inflated, strongly rounded, and marked by the continuation of the axial ribs, which grow into rather strong riblets on the umbilical wall. Aperture circular, slightly angulated at the posterior angle; peristome simple, the outer lip moderately thickened; the inner a little more so. A moderately straight callus covers the parietal wall, from which it is separated by an impressed line, thus rendering the peritreme complete. Operculum typically neocyclotid, showing 7 volutions.

The type, Carnegie Mus. No. 62.15065, comes from Las Nubes Estate, 4,000 feet elevation, Santa Marta Mountains, Colombia. It has 4.3 whorls and measures: Height, 19.5 mm.; greater diameter, 31.4 mm.; lesser diameter, 21.2 mm. Height of aperture, 13.4 mm.; diameter, 14.4 mm.

This species is nearest related to *A.* (*N.*) *corpulentum* (E. A. Smith), from which it can be readily distinguished by its much less channeled suture and smaller aperture.

APEROSTOMA (NEOCYCLOTUS) CHRYSACME, new species

PLATE 29, FIGURES 13–15

1906. *Neocyclotus* (*Neocyclotus*) *chrysacme* [Bartsch] FLUCK, Nautilus, vol. 20, p. 4 (nomen nudum).

Shell depressed-helicoid; the first 1.5 and the last 1.5 turns straw colored; the intermediate whorls golden. The last whorl in addition shows broad, regular hydrophanous zones, of which 3 are present between the summit and periphery and 3 on the anterior half of the base. The nucleus consists of 1.7 very small, strongly rounded, smooth turns; the postnuclear whorls are marked by wavy, vermiculated, slender riblets, which are about as wide as the spaces that separate them. Suture strongly impressed. Periphery well rounded. The last whorl slightly deflected. Base openly umbilicated, strongly rounded, and marked with the sculpture characterizing the upper surface of the last turn. In the umbilical wall, however, the axial sculpture consists of regular straight poorly developed riblets. Aperture large, circular; outer lip thin, somewhat effuse and slightly reflected; inner lip somewhat thickened. The parietal wall is covered by a callus.

The type, U.S.N.M. No. 186112, was collected by the Rev. William H. Fluck near Wani, Nicaragua. It has 5 whorls and measures: Height, 13.2 mm.; greater diameter, 20.2 mm.; lesser diameter, 14 mm. Height of aperture, 9 mm.; diameter, 9.3 mm.

U.S.N.M. No. 524007, a topotype, is a little larger but is a badly worn specimen that shows the inner peristome much thickened, particularly on the parietal wall. The extremely low spire will readily distinguish this from the other species.

Subgenus CYLCOPOMOPS, new name

1847. *Cyclopoma* TROSCHEL, Arch. Naturg., vol. 13, p. 381 (not *Cyclopoma* Agassiz, Recherches sur les poissons fossiles . . ., vol. 4, p. 17, 1833).

Small amphicyclotid mollusks having the inflated whorls marked by elevated axial ribs. Umbilicus open. Operculum too large to be withdrawn into the aperture.

Type: *Aperostoma* (*Cyclopomops*) *moricandi* (Pfeiffer).

Distribution: Bahia, Brazil.

APEROSTOMA (CYCLOPOMOPS) MORICANDI (Pfeiffer)

PLATE 40, FIGURES 7–9

1846. *Cyclostoma disjunctum* MORICAND, Mem. Soc. Genéve, vol. 11, p. 158, pl. 5, figs. 26–29 (not *Cyclostoma disjuncta* Matheron, Ann. Sci. Midi France, vol. 3, p. 59, 1832).

1847. *Cyclophorus disjunctus* PFEIFFER, Zeitschr. Malak., vol. 4, p. 108.

1847. *Cyclopoma disjunctum* TROSCHEL, Archiv Naturg., vol. 2, p. 381.

1852. *Cyclostoma moricandi* PFEIFFER, Zeitschr. Malak., vol. 9, p. 64.
1897. *Amphicyclotus moricandi* PFEIFFER, KOBELT and MÖLLENDORFF, Nachrb., deutschen malak. Ges., vol. 29, p. 139.

Shell minute, helicoid, bluish white. The nucleus consists of 1.5 inflated, well-rounded whorls, of which the first half turn is smooth; the rest bears 7 slender spiral threads. Postnuclear whorls inflated, strongly rounded. The first half turn bears the continuation of the spiral threads characterizing the nucleus and all the whorls, but the last four turns are marked by rather strong, distantly spaced, very regular scalariform axial ribs. Of these axial ribs 24 are present on the first turn and 30 on the second; on the remaining quarter of a turn they become gradually much more closely approximated and not quite so regular. In the broad spaces between the axial ribs microscopic incremental lines are present. Suture very strongly constricted. Periphery well rounded. Last whorl decidedly solute. Base openly umbilicated, inflated, strongly rounded and marked by the continuation of the axial ribs, which extend over the umbilical wall, and slender raised spiral hair lines, which are of equal strength but not of equal spacing. The operculum is concave on the outside, the edge being a deep groove separating the basal chondroid plate from the outer edge of the lamella. The calcareous lamella consists of about 11 obliquely outward-directed whorls which form a continuous concave surface; they are separated by a mere impressed line and are marked by numerous, closely spaced, slender, retractively curved threads. The center of the inner surface is raised into a papilla which has a central pit.

Of the animal Moricand also says that Blanchet, who sent him the specimens, wrote him that the tentacles were conical and that the eyes were placed at their base. The large specimen here figured has a little more than 4 whorls and measures: Height, 4 mm.; greater diameter, 5 mm.; lesser diameter, 3.8 mm.

Type locality: Province of Bahia, Brazil.

One of the two specimens in the Academy of Natural Sciences of Philadelphia, No. 12955, from Brazil, which were kindly lent to us for study, had a dried animal in it which yielded a radula having the formula 3 : 4 : 3 : 2.

To the casual observer, this most remarkable little mollusk would be deemed a member of the Oriental genus *Platyraphe*. In shape, nuclear and postnuclear sculpture, as well as in opercular characters, it resembles closely certain members of *Platyraphe* complex from the Philippines, but it lacks the internal sutural tube and puncture of that genus. It will be interesting to see what the soft anatomy will proclaim when a comparative study has been made.

Subgenus APEROSTOMA Troschel

1847. *Aperostoma* TROSCHEL, Zeitschr. Malak., vol. 4, p. 44.

Aperostomine shells in which the heavy calcareous deposit of the adjacent turns of the operculum are fused. This deposit is a little higher on the inner edge of the turns. The shells have an entire aperture and a peripheral band. Their sculpture consists of fine axial riblets; sometimes malleations are present. The aperture is wider than high.

Type: *Aperostoma* (*Aperostoma*) *blanchetianum* (Moricand).

Distribution: Costa Rica to eastern Brazil.

The radula formula of *A.* (*A.*) *leai* is 3 : 3 : 3 : 2. In *A.* (*A.*) *giganteum* (Reeve), *confusum* (Sykes), and *cardozi* (H. B. Baker) the verge is on the back of the neck behind the tentacles, traversed by a seminal groove. A short terminal appendage is present.

KEY TO THE SPECIES OF SUBGENUS APEROSTOMA[3]

- Upper surface malleated.
  - Upper surface conspicuously malleated.
    - Greater diameter more than 30 mm.
      - Rugosities coarse.
        - Umbilicus very large ---------- umbilicatum
        - Umbilicus narrow ---------- cumingi
      - Rugosities fine ---------- paezense
    - Greater diameter less than 22 mm.
      - Greater diameter more than 19 mm.
        - Rugosities closely crowded ---------- bogotense
        - Rugosities not closely crowded ---------- simile
      - Greater diameter less than 16 mm ---------- inconspicuum
  - Upper surface not conspicuously malleated.
    - Greater diameter more than 39 mm.
      - Periostracum dark chestnut-brown ---------- cingulatum
      - Periostracum olive-brown ---------- veracochanum
    - Greater diameter less than 31 mm ---------- allantayum
- Upper surface not malleated.
  - Posterior angle of aperture auriculate.
    - Umbilicus coarsely axially ribbed.
      - Greater diameter more than 38 mm ---------- dunkeri
      - Greater diameter less than 34 mm.
        - Periphery with a weak keel ---------- pailaense
        - Periphery without a weak keel ---------- paezicolum
    - Umbilicus not coarsely ribbed.
      - Peristome notched.
        - Notches of basal lip 2.
          - Height more than 23 mm.
            - Greater diameter more than 40 mm ---------- carmioli
            - Greater diameter less than 34 mm ---------- costaricense
          - Height less than 16 mm ---------- exiguum

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[3] We believe that *A.* (*A.*) *inca* (Orbigny) and *filoliratum* (Sowerby) belong in this subgenus, but having seen no specimens and having only poor illustrations we refrain from attempting to place them in the key.

- Upper surface not malleated—Continued.
  - Posterior angle of aperture auriculate—Continued.
    - Umbilicus not coarsely ribbed—Continued
      - Peristome notched—Continued
        - Notch of basal lip single.
          - Height more than 30 mm------------------ bisinuatum
          - Height less than 20 mm.
            - Greater diameter more than 36 mm------- irregulare
            - Greater diameter less than 30 mm----------- pittieri
      - Peristome not notched.
        - Shell helicoid------------------------------------- confusum
        - Shell depressed-helicoid.
          - Greater diameter more than 55 mm---------- giganteum
          - Greater diameter less than 50 mm.
            - Greater diameter more than 42 mm.
              - Umbilicus wide---------------------- manabense
              - Umbilicus not wide.
                - Last whorl deflected---------------- fischeri
                - Last whorl not deflected.
                  - Upper surface smoothish----- utriaense
                  - Upper surface rib-striate------ brujense
            - Greater diameter less than 36 mm----- portobellense
  - Posterior angle of aperture not auriculate.
    - Shell decidedly depressed.
      - Base rather strongly axially ribbed.
        - Aperture large-- fultoni
        - Aperture small---------------------------------- amazonense
      - Base not strongly axially ribbed.
        - Greater diameter more than 35 mm---------------- laxatum
        - Greater diameter less than 30 mm.
          - Upper surface finely axially ribbed.
            - Axial ribs on periphery present.
              - Suture narrowly channeled------ blanchetianum
              - Suture not narrowly channeled-------- peruense
            - Axial ribs on periphery obsolete---------------- leai
          - Upper surface obsoletely axially ribbed.
            - Whorls downward sloping toward the suture------------------------------- venezuelense
            - Whorls not downward sloping toward the suture-------------------------------- depressum
    - Shell not decidedly depressed.
      - Aperture large.
        - Axial ribs of umbilical wall stronger than on upper surface.
          - Umbilicus narrow------------------------- ecuadorense
          - Umbilicus not narrow.
            - Upper surface closely finely ribbed--- subcingulatum
            - Upper surface obsoletely finely ribbed------ quitense
        - Axial ribs of umbilical wall not stronger than those on upper surface.
          - Last whorl regularly finely ribbed.
            - Shell pale olive colored---------------- olivaceum
            - Shell brown---------------------------- castaneum

- Upper surface not malleated—Continued.
  - Posterior angle of aperture not auriculate—Continued.
    - Shell not decidedly depressed—Continued.
      - Aperture large—Continued.
        - Axial ribs of umbilical wall not stronger than those on upper surface—Continued.
          - Last whorl not regularly finely ribbed.
            - Umbilicus very broad ---------- peruvianum
            - Umbilicus not very broad.
              - Summit of last whorl appressed to preceding turn ---------- salengoense
              - Summit of last whorl not appressed to preceding turn.
                - Shell helicoid ---------- masvense
                - Shell depressed-helicoid.
                  - Suture impressed ---------- agassizi
                  - Suture not impressed ---------- nevadense
      - Aperture not large.
        - Last whorl deflected below subperipheral brown band.
          - Umbilicus narrow ---------- fasciatum
          - Umbilicus moderately broad ---------- pazi
        - Last whorl not deflected below subperipheral brown band.
          - Base with a median brown band.
            - Peristome with a sinus below basal brown band ---------- caucaense
            - Peristome without a sinus below basal brown band.
              - Greater diameter more than 27 mm. ---------- colombiense
              - Greater diameter less than 25 mm.
                - Upper surface regularly finely ribbed ---------- perezi
                - Upper surface not regularly finely ribbed.
                  - Suture strongly impressed ---------- boliviense
                  - Suture not strongly impressed ---------- redfieldi
          - Base without median brown band.
            - Greater diameter more than 27 mm ---------- currani
            - Greater diameter less than 25 mm.
              - Aperture deflected below subperipheral brown band ---------- nanum
                - Supraperipheral light zone very conspicuous ---------- merrilli
                - Supraperipheral light zone obsolete ---------- pulchellum
              - Aperture not deflected below subperipheral brown band.
                - Upper surface with oblique scratches ---------- popayanum
                - Upper surface without oblique scratches.
                  - Dark band covering half of base ---------- balsasense
                  - Dark band not covering half of base ---------- cardozi

THE GROUP OF APEROSTOMA (APEROSTOMA) UMBILICATUM

This group embraces the species having the upper surface of the last whorl malleated.

APEROSTOMA (APEROSTOMA) UMBILICATUM, new species

Plate 31, Figures 1–3

Shell very depressed-helicoid, very dark brown; the early whorls paler; interior of aperture bluish white. The nucleus consists of 2 small, well-rounded, smooth turns; the postnuclear whorls are moderately rounded and marked by retractively slanting lines of growth and numerous, very rough malleations. Suture strongly impressed. Periphery rendered decidedly angulated by a low keel. Base very openly umbilicated, somewhat inflated, strongly rounded, and marked by the continuation of the axial sculpture and strong malleations, which on the posterior half also produce several impressed spiral lines. The umbilical wall also is malleated. Aperture irregularly broadly tear-shaped and drawn out into a rather broad angle at the posterior angle. There is a groove in the center of this angulation; peristome simple, very slightly more thickened on the inner lip than on the outer. The parietal wall is covered by a rather thick callus, which renders the peritreme complete. Operculum typically aperostomid, of about 8 whorls.

The type, U.S.N.M. No. 307428, comes from Bogota, Colombia. It has 4.7 whorls and measures: Height, 20.5 mm.; greater diameter, 38.5 mm.; lesser diameter, 27.7 mm. Height of aperture, 14.8 mm.; diameter, 16.8 mm.

This species is distinguished from all the other members of the group by its very strong malleations, which lend to the surface a decidedly rugose aspect.

APEROSTOMA (APEROSTOMA) CUMINGI, new species

Plate 31, Figures 19–21

Shell of medium size, depressed-helicoid, covered with a very dark olivaceous-brown periostracum; the early whorls being denuded of this appear red; interior of aperture bluish white. The nucleus consists of 2.5 well-rounded smooth turns. Postnuclear whorls well rounded, the first marked by retractively curved, somewhat irregular, feeble axial riblets; the last by incremental lines and oblique scratches and malleations, which render this whorl decidedly rough. Suture deeply impressed. Periphery rendered angulated by a low keel, which slopes more abruptly dorsally than ventrally. Base narrowly umbilicated, inflated, strongly rounded, and marked like the spire, except that on the posterior portion the malleations form several more or less impressed lines. The umbilical wall is rough and shows less of the malleation. Aperture circular with a slightly obtuse angle at the posterior angle; peristome simple; that of the outer lip thin, while the inner is thickened and continues as a heavy callus over the parietal wall, which renders the peritreme complete.

The type, U.S.N.M. No. 307416, was collected by Cuming in Colombia. It has 4.3 whorls and measures: Height, 19.3 mm.; greater diameter, 30.2 mm.; lesser diameter, 20.8 mm. Height of aperture, 12.5 mm.; diameter, 14.8 mm.

This species comes nearest to *A.* (*A.*) *umbilicatum* in strength of the malleations and roughness but is easily distinguished from that by its slightly more elevated form, weaker sculpture, and much narrower umbilicus.

APEROSTOMA (APEROSTOMA) PAEZENSE, new species

PLATE 31, FIGURES 7–9

Shell very depressed-helicoid; the denuded nuclear whorls reddish; the rest of the postnuclear whorls are covered by a rather thick periostracum, that of the first whorl being olivaceous brown, while the last whorl is dark chesnut brown. There is a slender narrow zone of pale olive yellow immediately above the peripheral keel. There is a very broad almost blackish brown zone occupying the peripheral keel and about one-fourth of the base anterior to the keel. A second similar dark narrow zone is separated from the broad one by a moderately broad space. The rest of the base is paler than the upper surface; interior of aperture bluish white. The nucleus consists of a little more than 2 small, well-rounded, smooth turns. The postnuclear whorls are well rounded, the last one slightly flattened toward the suture, dropping a trifle below the periphery on the last fifth of the last turn. The first postnuclear whorl is marked by feeble retractively slanting lines of growth, which gain in strength on the next turn, where they are a little heavier than hair lines and irregular in distribution and development. On the last turn fine malleations and scratches appear, in addition to the above sculpture. Suture well impressed. Periphery weakly angulated. Base broadly openly umbilicated, slightly inflated, well rounded, and marked by the continuation of the lines of growth which assume the strength of riblets on the umbilical wall. Aperture irregularly tear-shaped, decidedly oblique, drawn into an angle at the posterior angle and somewhat angulated at the junction of the basal and outer lip; peristome simple; the outer lip thin; the inner thickened and reflected. The parietal wall is covered by a rather thick callus, which renders the peritreme complete. Operculum typically aperostomid, having about 8 whorls.

The type, U.S.N.M. No. 251169, was collected by H. Pittier in the valley of the Rio Paez, in the Central Cordilleras, Colombia. It has 4.5 whorls and measures: Height, 20.9 mm.; greater diameter, 37.3 mm.; lesser diameter, 26.3 mm. Height of aperture, 13.8 mm.; diameter, 17.7 mm.

In the open umbilication, this species resembles *A.* (*A.*) *umbilicatum*, from which it is easily differentiated by its color scheme and the much larger aperture, as well as the much finer sculpture.

APEROSTOMA (APEROSTOMA) BOGOTENSE (Pfeiffer)

Plate 31, Figures 4–6

1855. *Cyclostoma* (*Cyclotus*) *bogotense* Pfeiffer, Proc. Zool. Soc. London, vol. 23, p. 117.

1858. *Cyclotus bogotensis* Pfeiffer, Monographia pneumonomoporum viventium, vol. 2, p. 17.

1863. *Cyclotus bogotensis* Reeve, Conchologia iconica, vol. 14, sp. 20.

1897. *Neocyclotus* (*Neocyclotus*) *bogotensis* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

1923. *Poteria* (*Neocyclotus*) *bogotensis*, H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 44.

Shell small, depressed-helicoid, varying from olivaceous to olivaceous-brown, with a dark zone at the periphery and usually a narrow light one above it. The base is bicolor, that of the posterior half being olivaceous, while the anterior half is much paler; interior of aperture bluish white. The nucleus consists of 2.3 rather large, well-rounded, smooth turns. The postnuclear whorls are well rounded, the last one being slightly flattened below the summit and marked by strong, small malleations, which give the upper surface of the shell not only a malleated but a somewhat vermiculated aspect. The last whorl is slightly decurrent on the last quarter of the turn. Suture very strongly impressed. Periphery weakly angulated. Base moderately broadly umbilicated, somewhat inflated, well rounded, and marked by almost vertical, irregular, incremental lines, which are a little stronger on the umbilical wall, and feeble malleations. Aperture circular with a slight angulation at the posterior angle; peristome simple, the outer lip thin, the inner slightly thickened posteriorly. The parietal wall is covered by a thick callus which renders the peritreme complete.

The specimen described and figured is one of three, U.S.N.M. No. 316133, which comes from Bogota, Colombia. It has 3.8 whorls and measures: Height, 13.3 mm.; greater diameter, 20.5 mm.; lesser diameter, 14.7 mm. Height of aperture, 9.2 mm.; diameter, 9.4 mm.

U.S.N.M. No. 524128 contains 1 specimen without specific locality.

The small size will easily distinguish this from the other members except *A.* (*A.*) *inconspicuum* (Sowerby), which is even smaller.

APEROSTOMA (APEROSTOMA) SIMILE, new species

Plate 31, Figures 13–15

Shell helicoid, small, covered with a horn-colored periostracum, which on the last whorl becomes decidedly olivaceous. There is a broad, pale, darker band on the posterior half of the base. The nucleus consists of about 1.5 smooth turns. The postnuclear whorls are marked by retractively slanting incremental lines, which become increasingly closer spaced as the shell advances in age. In addition to these incremental lines the whorls are marked by rugosities separated by more or less strongly impressed scratches. Suture well impressed. Periphery feebly angulated. Base somewhat inflated, rather openly umbilicated, well rounded, and marked by the continuation of the incremental lines, which extend upon the umbilical wall, and mere indications of rugosities. Aperture subcircular, oblique; peristome simple, the outer thin; the inner somewhat thickened, more so on the parietal wall. Operculum typically aperostomid.

The type, U.S.N.M. No. 535989, was received from Sowerby & Fulton with the locality "Bogota" (Colombia). It has 4.1 whorls and measures: Height, 13 mm.; greater diameter, 19.3 mm.; lesser diameter, 15 mm.

U.S.N.M. No. 307398 contains another specimen from the same locality, while U.S.N.M. No. 307400 contains a specimen bearing the label "New Grenada."

In size and general coloration this species agrees fairly well with *A.* (*A.*) *bogotense* (Pfeiffer). The less developed rugose sculpture and more scattered nodulation will readily distinguish it from this.

APEROSTOMA (APEROSTOMA) INCONSPICUUM (Sowerby)

Plate 31, Figures 10–12

1843. *Cyclostoma inconspicuum* Sowerby, Thesaurus Conchyliorum, vol. 1, p. 109, pl. 24, figs. 73–74.

1912. *Neocyclotus papayanus fasciata* Kobelt (pars), Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, pt. 3, p. 901.

1923. *Poteria* (*Neocyclotus*) *inconspicuum*, H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 44.

Shell small, helicoid, covered by a pale-brown periostracum. There is a narrow pale chestnut zone immediately below the periphery, and above this a white band of about the same width. The posterior half of the base below the dark band is olivaceous, gradually paling toward the umbilicus. The nucleus consists of about 1.5 small, inflated, well-rounded, smooth turns. The early postnuclear whorls are marked by regular, almost vertical, slender riblets, which are separated by spaces no wider than the riblets. On the succeeding turns the axial riblets become reduced to incremental lines, and on the last one in addition to these oblique, irregularly scattered, impressed scratches are present, which cause the spaces between them to appear as basal rugosities. Periphery feebly angulated. Base inflated, strongly rounded, broadly openly umbilicated, and marked like the spire. The umbilical wall is marked by incremental lines. Aperture large, subcircular, slightly auriculated at the posterior angle; peristome simple, thin all around.

The specimen described and figured, U.S.N.M. No. 116667, comes from the Lea collection and bears no locality label. It has 4.4 whorls and measures: Height, 12 mm.; greater diameter, 15.9 mm.; lesser diameter, 12.5 mm.

The small size readily distinguishes this from all the other Aperostomas.

APEROSTOMA (APEROSTOMA) CINGULATUM (Sowerby)

Plate 31, Figures 22–24

1843. *Cyclostoma cingulatum* Sowerby, Thesaurus conchyliorum, vol. 1, p. 93, pl. 29, figs. 213–214.

1852. *Cyclotus cingulatus* Pfeiffer, Monographia pneumonopomorum viventium, vol. 1, p. 18.

1866. *Cyclotus angulatus* Bland, Amer. Journ. Conch., vol. 2, p. 59 (error for *cingulatus;* not *angulatus* von Martens 1874).

1897. *Neocyclotus* (*Neocyclotus*) *cingulatus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

1923. *Poteria* (*Neocyclotus*) *cingulatum* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 42.

Shell depressed-helicoid, covered with a very dark chestnut-brown periostracum; the early denuded whorls reddish. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are well rounded, the last slightly flattened below the suture. The first postnuclear whorl is marked by slender, retractively curved, somewhat irregular, fine, rather closely spaced riblets, which become very much enfeebled on the last half of the last turn and toward the end completely lost. In adition to this, the upper surface of the last whorl is irregularly slightly malleated. Suture well impressed. Periphery very feebly angulated. Base moderately broadly openly umbilicated, inflated, and marked by rather irregular wavy axial riblets, which become very much intensified on the umbilical wall, and rather conspicuous malleations stronger than those on the upper surface. Aperture oblique, circular, slightly angulated at the posterior angle; peristome simple, thin on the outer lip and thickened on the inner, with a very heavy callus on the parietal wall, which renders the peritreme complete. The operculum is typically aperostomid of about 8 whorls.

The specimen described and figured, U.N.S.M No. 307422, comes from Cauca, Colombia. It has 4.4 whorls and measures: Height, 24.7 mm.; greater diameter, 43.8 mm.; lesser diameter, 29.3 mm. Height of aperture, 17.5 mm.; diameter, 20.5 mm.

There are four additional lots in the National Museum collection: No. 414158, one specimen from Jerico, Antioquia, Colombia. No. 424727, two specimens collected by H. Daniel at Jerico, Antioquia. One of these is much larger than the one figured. It has 4.8 whorls and measures. Height, 31.2 mm.; greater diameter, 52 mm.; lesser diameter, 35 mm. Height of aperture, 20 mm.; diameter, 26.2 mm. No. 307419, one specimen labeled "Colombia." No. 307457, labeled "South America."

This species belongs to the group that is only feebly malleated on the upper surface. The dark color will distinguish it from *A.* (*A.*) *veracochanum*, which is very much thinner-shelled and much paler.

APEROSTOMA (APEROSTOMA) VERACOCHANUM, new species

Plate 31, Figures 16–18

Shell very depressed-helicoid, covered with a pale olivaceous-brown periostracum, which on the last part of the last whorl becomes decidedly olivaceous both on the upper and lower surfaces. The early denuded whorls are reddish; interior of the aperture bluish white. The nucleus consists of a little more than 2 moderately well-rounded smooth turns; the post-nuclear whorls are moderately rounded and marked by weak retractively curved axial riblets, which find their strongest expression on the first half of the last turn. On the last half, they are enfeebled. Suture strongly impressed, slightly channeled on the last part of the last whorl. Periphery very weakly angulated. Base openly umbilicated, strongly rounded, and marked by the continuation of the axial ribs, which on the umbilical wall become much strengthened and fused. Aperture very broadly tear-shaped, with a conspicuously drawn-out angle at the posterior angle, which has a groove in its middle; peristome simple; the outer lip thin; the inner slightly thickened. The parietal wall is covered by a callus which renders the peritreme complete.

The type, U.S.N.M. No. 524045, was collected by the Wilkes Exploring Expedition at Maguas, Peru. It has 4.5 whorls and measures: Height, 24.4 mm.; greater diameter, 43.2 mm.; lesser diameter, 31.5 mm. Height of aperture, 16.3 mm.; diameter, 18.5 mm.

This species has a much thinner shell and is much paler than *A.* (*A.*) *cingulatum* (Sowerby).

APEROSTOMA (APEROSTOMA) ALLANTAYUM, new species

PLATE 32, FIGURES 4–6

Shell of medium size, very depressed-helicoid; the early denuded whorls are soiled flesh colored; the succeeding turns dark straw colored with an orange flush, the last reddish chestnut-brown with a narrow light zone immediately above the narrow dark band at the periphery; posterior half of the base a little darker than the upper surface, while the anterior is considerably paler; interior of aperture bluish white. The nucleus consists of about 2 small, well-rounded, smooth turns; the postnuclear whorls are moderately well rounded, all but the last marked by very regular, retractively slanting axial riblets, which are about as wide as the spaces that separate them. On the last whorl these become much enfeebled and reduced to irregular lines of growth. Here, too, we have slight indications of malleations. The last whorl is slightly decurrent on the last quarter of a turn. Suture well impressed. Periphery feebly obsoletely angulated. Base openly umbilicated, inflated, well rounded and marked by irregular, wavy, strong incremental lines, which are developed into irregular ribs on the umbilical wall. Aperture decidedly oblique, very broadly tear-shaped, with a pronounced drawn-out angulation at the posterior angle, which has a groove in its middle on the inside; peristome simple; the outer lip thin; the inner somewhat thickened. The parietal wall is covered by a thick callus which renders the peritreme complete.

The type, U.S.N.M. No. 524046, comes from the Rich collection and is labeled "Peru." It has 4.4 whorls and measures: Height, 17.4 mm.; greater diameter, 30.3 mm.; lesser diameter, 21.2 mm. Height of aperture, 11.7 mm.; diameter, 13.9 mm.

U.S.N.M. No. 22203 contains another specimen received from MacAndrew labeled "Peru."

The conspicuous bicolored base readily distinguishes this from the other feebly malleated members of this group.

THE GROUP OF APEROSTOMA (APEROSTOMA) DUNKERI

Umbilical wall strongly distinctly axially ribbed.

APEROSTOMA (APEROSTOMA) DUNKERI (Pfeiffer)

PLATE 32, FIGURES 1–3

1856. *Cyclotus dunkeri* PFEIFFER, Malak. Blätter, vol. 3, p. 256.

1864. *Cyclotus dunkeri* REEVE, Conchologia iconica, vol. 14, pl. 2, sp. 9.

1897. *Neocyclotus* (*Neocyclotus*) *dunkeri* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

1923. *Poteria* (*Neocyclotus*) *dunkeri* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, pp. 39, 40, 43.

Shell depressed-helicoid, the early whorls soiled flesh white; the later turns gradually becoming chestnut brown. There is a broad spiral dark zone covering the posterior half of the base, which gradually becomes paler from the periphery basally. The rest of the base is much paler, so that there is a bicolor effect on the base; interior of aperture decidedly bluish white. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are weakly rounded, the last one flattened a little below the summit, and marked by retractively curved, rather regular axial riblets, which are a little wider than the spaces that separate them. On the last turn, however, these riblets gradually become enfeebled, and on the last portion of this whorl they are merely represented by irregular lines of growth. The last whorl is slightly decurrent on the last fifth of a turn. Suture strongly impressed. Periphery rounded; the peculiar banding at the periphery, however, gives it the effect of being angulated, which is an optical illusion. Base very openly umbilicated, somewhat inflated, well rounded; the posterior half is marked by the continuation of the axial ribs which are stronger than on the upper surface, and on the anterior half become fused into strong, distinct, broad, rounded ribs, which cross the sloping umbilical wall. Aperture very broadly tear-shaped with a decidedly drawn-out auricle at the posterior angle, which has an impressed groove in its middle; peristome simple, the outer lip thin; the inner thickened. The parietal wall is covered by a thick callus, which renders the peritreme complete. Operculum typically aperostomid, having 10 whorls.

The specimen described and figured is one of two, U.S.N.M. No. 251170, collected by H. Pittier in the Rio Paila Valley, Colombia, at an altitude of 1,800 meters. It has 4.8 whorls and measures: Height, 20.4 mm.; greater diameter, 38.5 mm.; lesser diameter, 26 mm. Height of aperture, 13 mm.; diameter, 17.5 mm.

The larger size of this species distinguishes it from the other two members here described as having strong ribs on the umbilical wall.

APEROSTOMA (APEROSTOMA) PAILAENSE, new species

Plate 32, Figures 7–9

Shell quite small, depressed-helicoid. The shreds of periostracum remaining would indicate that this was straw-colored with a gold tinge. The denuded surface is uniformly bluish white; interior of aperture bluish white. The nucleus consists of 2 small, well-rounded, smooth turns; the postnuclear whorls are moderately well rounded; the last slightly flattened below the summit, marked by retractively curved slender axial riblets, which are about as wide as the spaces that separate them. On the last half of the last whorl these riblets become much enfeebled and form rather irregular, broad incremental elements. Suture strongly impressed. Periphery with a weak angulation. Base moderately openly umbilicated, inflated, well rounded, and marked by strong axial ribs which gradually increase in intensity toward the umbilicus, being strongest on the sloping umbilical wall. Aperture very broadly oval, with a conspicuous auricle at the posterior angle, which bears a groove in its middle; peristome simple; the outer lip thin; the inner thickened. The parietal wall with a very thick callus rendering the peritreme complete.

The type, U.S.N.M. No. 251171, was collected by H. Pittier in the Rio Paila Valley, Colombia, at an altitude of 1,300 meters. It has 4.3 whorls and measures: Height, 16.3 mm.; greater diameter, 27.8 mm.; lesser diameter, 18.9 mm. Height of aperture, 11.7 mm.; diameter, 13.9 mm.

This species is readily distinguished from the other two with strong ribs on the umbilical wall by its exceedingly small size.

APEROSTOMA (APEROSTOMA) PAEZICOLUM, new species

PLATE 32, FIGURES 13–15

Shell depressed-helicoid, the early whorls reddish; the last whorl olivaceous with axial streaks of brown, which vary in width and spacing. There is a narrow light zone immediately above the periphery. Below the periphery the posterior half of the base has a dark chestnut-brown area; the anterior half is olivaceous brown and much paler. The axial darker streaks mentioned for the upper surface also are apparent on the lower. Interior of aperture bluish white. The nucleus consists of 2.1 small, well-rounded, smooth turns. The postnuclear whorls are moderately well rounded; the last is slightly decurrent on the last half whorl and slightly flattened below the summit. The postnuclear whorls are marked by slender, retractively curved axial riblets, which are a little wider than the spaces that separate them. On the last whorl these become less strongly developed and more irregular. There is also a weak indication of a few scratches, showing the affinity of the species to the malleated form. Suture strongly impressed. Periphery well rounded. Base openly umbilicated, somewhat inflated, well rounded, and marked by the continuation of the sculpture characterizing the upper surface; the riblets, however, become fused on the umbilical wall to form strong and quite regular rather broad ribs on its sloping surface. Aperture almost circular with a conspicuous auricle at the posterior angle, which bears a groove in its middle; peristome simple; outer lip thin; the inner thickened. The parietal wall is covered by a thick callus, which renders the peritreme complete. The operculum is typically aperostomid, having 10 whorls.

The type, U.S.N.M. No. 524047, was collected by H. Pittier in the Rio Paez Valley, Colombia, at an elevation of 2,500 meters. It has 4.7 whorls and measures: Height, 18.7 mm.; greater diameter, 33.1 mm.; lesser diameter, 22.2 mm. Height of aperture, 12.8 mm.; diameter, 15.6 mm.

Its smaller size will readily differentiate this from *A.* (*A.*) *dunkeri* (Pfeiffer).

GROUP OF APEROSTOMA (APEROSTOMA) CARMIOLI

Umbilical wall closely finely axially ribbed.

APEROSTOMA (APEROSTOMA) CARMIOLI, new species

Plate 32, Figures 19–21

Shell large, helicoid; the early turns reddish; the later covered on the upper surface by a golden-yellow periostracum. There is a light zone immediately above the periphery, while the posterior half of the base is chestnut brown; the rest is of the same color as the upper surface; interior of aperture bluish white. The nucleus consists of 2 small, well-rounded, smooth turns; the postnuclear whorls are inflated, strongly rounded, and marked on the upper surface by very weak, retractively curved, flattened riblets, which become evanescent on the last whorl. Suture strongly impressed. Periphery well rounded. Base openly umbilicated, inflated, well rounded, and marked by the continuation of the axial ribs, which gain in intensity below the middle and become stronger on the umbilical wall, where they form distinct fine ribs, which are not quite as wide as the spaces that separate them. The last whorl is slightly decurrent near the peristome. Aperture large, broadly oval with a conspicuous angle at the posterior angle, which has a groove in the middle; peristome simple; the outer lip thin. The basal lip bears 2 notches; the inner lip is somewhat thickened, while the parietal wall is covered with a moderately thick callus, which renders the peritreme complete.

The type, U.S.N.M. No. 25034, was collected by Carmiol in Costa Rica. It has 4.9 whorls and measures: Height, 27.2 mm.; greater diameter, 40.4 mm.; lesser diameter, 29.4 mm. Height of aperture, 16.5 mm.; diameter, 19 mm.

U.S.N.M. No. 405227 contains a young specimen collected by M. Valerio at Chitaria, Costa Rica.

This species differs from the other members of this group by being considerably larger.

APEROSTOMA (APEROSTOMA) COSTARICENSE (von Martens)

PLATE 32, FIGURES 16–18

1876. *Cyclotus quitensis costaricensis* VON MARTENS, Jahrb. deutschen malak. Ges., vol. 3, p. 254.

Shell helicoid, covered by a thin golden-yellow periostracum. The base bears a moderately broad chestnut-colored band, which fades anteriorly into the basal color, which is a little darker than that of the upper surface; interior of the aperture bluish white. The nucleus consists of 2 small, well-rounded, smooth turns; the postnuclear whorls are inflated, strongly rounded; the last one is slightly flattened below the summit and is marked by obsolete hairlike axial riblets, which become much enfeebled on the last half of the last turn. The last fifth of the last turn is slightly decurrent. Suture strongly impressed. Periphery feebly angulated. Base narrowly umbilicated, marked by the continuation of the axial ribs, which become fused and slightly stronger on the umbilical wall. Aperture very oblique, subcircular with a decided auriculation at the posterior angle, which bears a groove in its middle; peristome simple; the basal lip with 2 deep notches, one marking the outer limit of the umbilicus; the inner lip is slightly thickened. The parietal wall is covered by a moderately thick callus, which renders the peritreme complete.

U.S.N.M. No. 321045 contains two specimens from the Redfield collection, apparently received from Gabb. They come from Costa Rica. The largest of these, which we have figured, has 4.7 whorls and measures: Height, 23 mm.; greater diameter, 31.7 mm.; lesser diameter, 24.4 mm. Height of aperture, 14.9 mm.; diameter, 15.3 mm.

U.S.N.M. No. 524052 contains another specimen collected by M. Valerio.

The much smaller size of this species readily differentiates it from *A.* (*A.*) *carmioli.*

APEROSTOMA (APEROSTOMA) EXIGUUM, new species

PLATE 32, FIGURES 10–12

Shell small, depressed-helicoid; the upper surface covered with a golden yellow peristracum. There is a broad light zone immediately above the periphery and a still broader dark zone immediately below this; the rest of the base is a little paler than the upper surface. Interior of aperture bluish white. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are somewhat inflated, well rounded and marked by slightly wavy, well-developed axial riblets, which are about as wide as the spaces that separate them. There is an impressed groove a little below the summit on the last whorl, which gives the upper edge of this whorl a somewhat flattened aspect. The last whorl also is slightly decurrent near the peristome. Suture strongly impressed. Periphery weakly angulated. Base openly umbilicated, inflated, well rounded, and marked by the continuation of the axial riblets, which fuse into heavier riblets on the umbilical wall. Aperture subcircular, with a conspicuous auricle at the posterior angle, which has a groove in its center; peristome simple; outer lip thin; the basal lip with 2 deep incisions, the first of which marks the outer limit of the umbilicus, and the other is about halfway between this and the periphery; the inner lip is moderately thickened, while the parietal wall is covered by a moderately strong callus, which renders the peritreme complete.

The type, U.S.N.M. No. 190281, was collected by H. Pittier in the Zhorquin Valley, Talamanca, Costa Rica. It has 4.5 whorls and measures: Height, 15.4 mm.; greater diameter, 23.7 mm.; lesser diameter, 16.4 mm. Height of aperture, 9.6 mm.; diameter, 11.7 mm.

This species can readily be distinguished from the other members of the group having two notches on the basal area by its very much smaller size.

APEROSTOMA (APEROSTOMA) BISINUATUM (von Martens)

Plate 33, Figures 5, 6

1864. *Cyclotus bisinuatus* von Martens, Malak. Blätter, vol. 11, p. 113, pl. 3, figs. 1, 2.

1890. *Cyclotus* (*Aperostoma*) *bisinuatus* von Martens, Biologia Centrali-Americana, p. 3.

1897. *Neocyclotus* (*Neocylotus*) *bisinuatus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

We have not seen this species and give a translation of von Martens' description:

Shell umbilicated, turbinate, solid, marked by closely spaced, undulating, confluent riblets, yellowish brown unicolor. Spire conic, somewhat acute. Whorls 5, quite convex, the last one rounded, flattened at the suture. Umbilicus quite narrow funnel-shaped, delimited by an obsolete angle. Aperture diagonal, ovate, circular, angulated above, bluish white within; peristome straight, obtuse, emarginate above and below. Columellar margin arcuate; major diameter, 38.5 mm.; lesser diameter, 29 mm. Height, 31 mm. Aperture, 20 mm.

Discovered in a high plateau of Costa Rica by the late Hoffmann who sent it to the Berlin Museum.

This species is distinguished from the other members of the group by the two notches, one at the outer limit of the umbilicus, and the other diametrically across from it in the outer lip, a little posterior to the middle.

APEROSTOMA (APEROSTOMA) IRREGULARE (Pfeiffer)

Plate 33, Figure 4

1855. *Cyclostoma* (*Cyclotus*) *irregulare* Pfeiffer, Proc. Zool. Soc. London, vol. 23, p. 117.

1858. *Cyclotus irregularis* Pfeiffer, Monographia pneumonopomorum viventium, vol. 2, p. 15.

1864. *Cyclotus irregularis* Reeve, Conchologia iconica, vol. 14, pl. 4, fig. 18.

1890. *Cyclotus* (*Aperostoma*) *irregularis* von Martens, Biologia Centrali-Americana, Suppl., pp. 3, 596.

1897. *Neocyclotus* (*Neocyclotus*) *irregularis* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

1923. *Poteria* (*Neocyclotus*) *irregulare* H. B. Baker, Occ. pap., Mus. Zool. Univ. Michigan, No. 137, p. 41.

As we have not seen this species we give a translation of Pfeiffer's description:

Shell umbilicated, depressed-turbinate, solid, closely striated, yellowish. The spire is shortly turbinate, acute. Suture profound. Whorls 5, convex, the last swollen above and broadly canaliculate at the suture; below marked by a broad median band. The broadly funnel-shaped umbilicus is limited on the outside by a strong angulation. Aperture oblique, triangularly oval, angulated above; peristome continuous, slightly adnate to the preceding turn, straight. The right outer lip dilated; columella thickened moderately arcuate, channeled basally. Major diameter, 37 mm.; lesser, 30 mm.; altitude, 19 mm.

Habitat: Central Costa Rica.

Reeve's figure shows a decided notch at the junction of the inner and basal lip which is responsible for the angulation marking the outer edge of the umbilicus.

The species appears most nearly related to *A.* (*A.*) *pittieri* (von Martens) but differs from it in being much larger.

APEROSTOMA (APEROSTOMA) PITTIERI (von Martens)

1900. *Cyclotus* (*Aperostoma*) *irregularis pittieri* von Martens, Biologia Centrali-Americana, Suppl., p. 597.

1923. *Poteria* (*Neocyclotus*) *irregularis pittieri*, H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 41.

We have not seen this species. Von Martens distinguishes it from *A.* (*A*) *irregulare* Pfeiffer with the following diagnosis, which we translate:

Distinctly flatter than the typical form [*irregulare*], less vaulted, 29 mm. only in diameter and 16.5 mm. in height. Aperture 12 mm.

Habitat: Salinas Bay, northwestern Costa Rica, collected by H. Pittier.

The much smaller size distinguishes this from *A.* (*A.*) *irregulare* (Pfeiffer).

THE GROUP OF APEROSTOMA (APEROSTOMA) GIGANTEUM

Posterior angle of aperture forming a slight angle, bearing a weakly impressed median groove.

APEROSTOMA (APEROSTOMA) CONFUSUM (Sykes)

PLATE 33, FIGURES 1–3

1846. *Cyclostoma giganteum* PFEIFFER, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 11, pl. 1, figs. 11–14 (not *C. giganteum* Reeve, Conchologia systematica, vol. 2, p. 99, pl. 184, fig. 17, 1842).

1901. *Aperostoma confusum* SYKES, Journ. Malac., vol. 8, p. 106, pl. 10, fig. 2.

1923. *Poteria* (*Neocyclotus*) *confusum* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 42.

Shell very large, helicoid. Our specimen of this species, unfortunately, is sadly denuded. However, it shows that there is a broad dark chestnut-colored band below the periphery and apparently a narrow light zone immediately above this; interior of aperture pale buff. The nucleus consists of about 2.4 small, well-rounded, smooth turns. The postnuclear whorls are marked by decidedly retractively slanting, rather irregular, closely approximated axial riblets, which on the last half of the last turn become confluent incremental elements. The summit of the whorls is appressed, and there is a slight concavity on the last turn below the summit. Suture well impressed. Periphery strongly rounded. Base narrowly umbilicated and marked by the continuation of the axial sculpture, which does not increase in differentiation on the umbilical wall. Aperture circular, oblique, with a small angulation bearing a central groove at the posterior angle; peristome simple; outer lip thin; the inner thickened and slightly reflected. The parietal wall is covered by a thick callus, which renders the peritreme complete. This callus is not in a straight line with the columella, but forms a little oval sinus.

The specimen that we believe belongs here, U.S.N.M. No. 341766, was collected by A. E. Heighway at Acandi, a small settlement in the Gulf of Atrato, on the boundary between Colombia and Panama. It has 5.3 whorls and measures: Height, 34.2 mm.; greater diameter, 51.5 mm.; lesser diameter, 38.2 mm. Height of aperture, 20.5 mm.; diameter, 24.8 mm.

This species is differentiated from the rest of the *giganteum* group by having the spire much more elevated.

APEROSTOMA (APEROSTOMA) GIGANTEUM (Reeve)

PLATE 33, FIGURES 7–9

1842. *Cyclostoma giganteum* REEVE, Conchologia systematica, vol. 2, p. 99, pl. 184, fig. 17.

1843. *Cyclostoma giganteum* SOWERBY, Thesaurus conchyliorum, p. 92, pl. 23, figs. 8, 9.

1843. *Cyclostoma giganteum* Sowerby, Proc. Zool. Soc. London, 1843, p. 30.
1847. *Aperostoma giganteum* Pfeiffer, Zeitsch. Malak., p. 104.
1850. *Cyclotus giganteus* Gray, Nomenclature of molluscous animals and shells in the collection of the British Museum, pt. 1, p. 6.
1897. *Neocyclotus* (*Neocyclotus*) *giganteus* Kobelt and Möllendorff, Nachrbl. deutschen malak. Ges., vol. 29, p. 137.
1901. *Aperostoma giganteum* Sykes, Journ. Malac., vol. 8, p. 105, pl. 10, fig. 1.
1923. *Poteria* (*Neocyclotus*) *gigantea* H. B. Baker, Occ. pap. Mus. Zool. Univ. Michigan, No. 137, pp. 40, 42.

Shell gigantic, depressed-helicoid. The early whorls pinkish; the later pale yellow, varying from yellow to pale chestnut, with a light zone below the summit and a broader yellowish zone immediately above the periphery. The posterior half of the base is chestnut-brown, while the anterior half and umbilical wall are yellowish horn colored; interior of aperture bluish. The nucleus consists of 2 very small, well-rounded, smooth turns. The postnuclear whorls are moderately rounded and appressed at the summit with an impressed groove immediately below the summit. The postnuclear whorls are marked by regular, retractively curved, closely spaced axial riblets, which are a little wider than the spaces that separate them. On the last half of the last whorl they become obsolete and are replaced by mere lines of growth. Suture strongly impressed. Periphery well rounded. Base with a very large open umbilicus, inflated, and marked by the continuation of the axial ribs, which become fused on the anterior half of the base and quite strong and well differentiated into strong ribs on the umbilical wall. Aperture oblique, subcircular, drawn into an obtuse angle at the posterior angle, which has a median groove; peristome simple; that of the outer lip sharp and slightly reflected, while the inner lip is thickened. The parietal wall is covered by a thick callus, which renders the peritreme complete. In the peristome there is a shallow sinus at the posterior termination of the columella. Operculum typically aperostomid, having 9 whorls.

The specimen described and figured is one of two, U.S.N.M. No. 251101, collected by H. Pittier on the Cerro de Garagara, Panama, at 20 to 900 meters. It has 3.7 whorls remaining and measures: Height, 32.6 mm.; greater diameter, 56.7 mm.; lesser diameter, 38.3 mm. Height of aperture, 23.5 mm.; diameter, 27 mm.

The depressed-helicoid form and gigantic dimensions readily distinguish this from the other members of the *giganteum* group.

Reeve, *loc. cit.*, p. 97, states: "Mr. Sowerby has kindly permitted us to refer to his figure of *Cyclostomata* in part 2 of his Species Conchyliorum, which we are happy to announce is now nearly ready for publication." This work, it would appear, was never published. *Cyclostoma giganteum* Sowerby must be considered a manuscript name, and the name *Cyclostoma giganteum* must date from Reeve, 1842.

APEROSTOMA (APEROSTOMA) MANABENSE, new species

Plate 34, Figures 10–12

Shell of medium size, very depressed-helicoid. The early denuded whorls pale red, the last covered with a thin, reddish olivaceous, horn-colored periostracum. There is a narrow light zone immediately above the periphery, while the posterior half of the base is chestnut-brown, and the anterior half and umbilical wall are paler than the upper surface; interior of aperture bluish white with a livid tinge. The nucleus consists of 2.4 small, well rounded, smooth turns. The postnuclear whorls are slightly rounded. There is a shallow groove immediately below the summit. The last whorl is obliquely deflected for about four-fifths of a turn. The postnuclear whorls are marked by weak, retractively slanting, very slender, closely spaced axial riblets, which become evanescent on the last half of the last turn, where they are represented by mere lines of growth. Suture well impressed. Periphery well rounded. Base broadly, openly umbilicated, inflated, strongly rounded, marked by the continuation of the axial riblets which become fused into stronger ribs on the anterior half of the base and umbilical wall. Aperture decidedly oblique, tear-shaped, drawn out into a decided angle at the posterior angle; peristome thin on the outer and basal lip; a little thicker on the inner lip. The parietal wall is covered by a thick callus, which renders the peritreme complete.

The type, U.S.N.M. No. 524066, was collected by O. Haught between Quevedo and Calcata, Manabi, Ecuador. It has 4.8 whorls and measures: Height, 23.2 mm.; greater diameter, 43 mm.; lesser diameter, 29.4 mm. Height of aperture, 16.5 mm.; diameter, 20.3 mm.

The wide umbilication suggests *A.* (*A.*) *giganteum* (Reeve), from which it is distinguished by its small size.

APEROSTOMA (APEROSTOMA) FISCHERI (Hidalgo)

Plate 34, Figures 1–3

1867. *Cyclotus fischeri* Hidalgo, Journ. Conchyl., vol. 15, p. 305, pl. 8, fig. 3.

1901. *Aperostoma fischeri* Sykes, Journ. Malac., vol. 8, p. 105, pl. 10, fig. 3.

1912. *Neocyclotus giganteus* Kobelt (pars), Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, pt. 3, p. 891, pl. 133, fig. 1.

1923. *Poteria* (*Neocyclotus*) *fischeri* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 42.

Shell moderately large, helicoid. The early whorls rose-red; the last covered with an olivaceous pale chestnut-colored periostracum. There is a narrow light zone at the periphery, while the posterior half of the base is conspicuously bright chestnut-brown; the anterior half and the umbilical wall are much paler. The interior of the aperture is bluish white. The nucleus consists of 2 very small, well-rounded smooth turns; the postnuclear whorls are moderately rounded, slightly flattened near the summit, the last one for about one-tenth of a turn forming a cord at the appressed summit. The postnuclear whorls are marked by fine, retractively curved axial riblets which are about as wide as the spaces that separate them but which become irregular and less developed on the last turn, particularly toward the aperture. Suture well impressed. Periphery feebly angulated. Base openly umbilicated, inflated, well rounded, and marked by the continuation of the axial riblets, which extend over the umbilical wall, where they become somewhat strengthened. Aperture subcircular, decidedly protracted at the posterior angle into an auricle, which bears a groove in its middle; peristome simple; the outer lip sharp and somewhat reflected; the inner somewhat thickened. The parietal wall is covered by a thick callus, which renders the peritreme complete. There is only a feeble inclination toward an inbending at the junction of the columella with the parietal wall. Operculum typically aperostomid, showing 9 whorls.

The specimen described and figured, U.S.N.M. No. 307424, comes from New Grenada. It has 4.9 whorls and measures: Height, 27.5 mm.; greater diameter, 47 mm.; lesser diameter, 32.4 mm. Height of aperture, 17 mm.; diameter, 22.8 mm.

U.S.N.M. No. 307421 contains one specimen from Quito, Ecuador.

This species can readily be distinguished from *A.* (*A.*) *utriaense* by its deflected last whorl.

APEROSTOMA (APEROSTOMA) UTRIAENSE, new species

Plate 34, Figures 4–6

Shell of medium size, depressed-helicoid. The upper surface is covered with a pale chestnut-brown periostracum, but there is a rather broad paler area immediately below the summit. There is also a light zone immediately above the periphery, while a broad chestnut-colored band extends over the posterior two-fifths of the base, the rest being pale olivaceous horn colored; interior of aperture bluish white. The nuclear whorls in the type are lost. The postnuclear whorls are well rounded and on the last turn there is a groove immediately below the periphery. The postnuclear whorls are marked by very fine, closely spaced, retractively slanting axial riblets, which become much weakened on the last whorl. Suture strongly impressed. Periphery well rounded. Base moderately broadly openly umbilicated, marked by the continuation of the axial sculpture, but much more roughly so. The axial ribs of the base become fused into stronger elements on the umbilical wall. Aperture subcircular, with a moderately strong angulation at the posterior angle, which bears a median groove; outer lip thin and somewhat reflected; the inner lip slightly thickened. The parietal wall is covered by a thick callus, which renders the peritreme complete. There is only a weak emargination on the columellar callus.

The type, U.S.N.M. No. 524068, comes from Puerto Utria, Colombia. It has 3.2 whorls remaining and measures: Height, 27.4 mm.; greater diameter, 46.7 mm.; lesser diameter, 30.9 mm. Height of aperture, 19.4 mm.; diameter, 23.3 mm.

This species most nearly resembles *A.* (*A.*) *brujense*, from which it can readily be differentiated by its less strongly ribbed striate sculpture.

APEROSTOMA (APEROSTOMA) BRUJENSE, new species

PLATE 34, FIGURES 13–15

Shell large, depressed-helicoid. The early denuded whorls vary from rose colored to flesh colored. The last whorl is covered with a brownish, suffused, horn-colored periostracum. There is a narrow light zone immediately above the periphery, while the posterior half of the base is very dark chestnut-brown, and the anterior half and umbilical wall are a little lighter than the upper surface. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are somewhat inflated, well rounded, with an impressed area immediately below the summit on the last whorl, while the summit itself appears as an appressed thread. The surface of the postnuclear whorls is marked by rather coarse, retractively slanting axial riblets, which vary considerably in strength and spacing. Suture well impressed. Periphery weakly angulated. Base moderately broadly umbilicated and marked by the continuation of the axial riblets, which become fused into stronger ribs on the umbilical wall. Aperture subcircular with a moderately strong angle at the posterior angle which bears a median groove; peristome simple; the outer lip expanded and somewhat reflected; the inner slightly thickened. The parietal wall is covered by a very thick callus, which renders the peritreme complete. There is very weak emargination in this callus at the insertion of the columella.

The type, U.S.N.M. No. 251418, was collected by Maj. E. A. Goldman on the Cerro Bruja, Panama, at an elevation of 500 feet. It has 4.7 whorls and measures: Height, 28.6 mm.; greater diameter, 49.4 mm.; lesser diameter, 33 mm. Height of aperture, 19.2 mm.; diameter, 24.4 mm.

The following additional specimens are in the National Museum collections: No. 524069, a topotype from the same source as the type; No. 228908, a specimen collected by H. Pittier in the mountains around Gaspasalana, High Mamoni, Panama; No. 251419, five specimens collected by Major Goldman at Gatun, Canal Zone.

This species can be distinguished readily from *A.* (*A.*) *utriaense* by its much stronger rib-striate sculpture.

APEROSTOMA (APEROSTOMA) PORTOBELLENSE, new species

PLATE 34, FIGURES 7–9.

Shell small for the group, depressed-helicoid. The early whorls red, the last covered on the upper surface by a thin horn-colored periostracum. There is a light supraperipheral zone and a dark area immediately below the periphery on the base. The rest is horn colored; interior of aperture pale buff. The nucleus consists of about 2 small, well-rounded turns. Postnuclear whorls well rounded, with a depressed area a little below the summit. The postnuclear whorls are marked by very slender, retractively curved, closely crowded axial ribs, which become coarser and more distantly spaced on the last whorl. Suture well impressed. Periphery slightly angulated. Base openly umbilicated and marked by the continuation of the axial ribs, which do not gain materially in strength on the umbilical wall. Aperture subcircular, drawn into a moderately produced angle at the posterior angle, which bears a groove in the middle; peristome simple; the outer lip expanded and slightly reflected; the inner slightly thickened. The parietal wall is covered by a thick callus, which renders the peritreme complete. There is only an emargination in the parietal callus.

The type, U.S.N.M. No. 251434, was collected by E. A. Schwarz at Porto Bello, Panama. It has 4.7 whorls and measures: Height, 21.5 mm.; greater diameter, 35 mm.; lesser diameter, 23.3 mm. Height of aperture, 15.2 mm.; diameter, 17.3 mm.

U.S.N.M. No. 251427 was collected by August Busck at Porto Bello, Panama.

This species can readily be distinguished from all the other members of the group by its small size.

APEROSTOMA (APEROSTOMA) FULTONI, new species

PLATE 35, FIGURES 1–4

Shell depressed-helicoid, chestnut brown, with a lighter zone at the summit and a white zone immediately above the periphery. There is a broad dark brown band covering two-fifths of the base immediately below the periphery and a slender narrow band a little posterior to the middle of the base. The rest of the base is yellow horn colored; interior of aperture bluish white, showing the banding within. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are strongly rounded with a depressed area immediately below the summit. The postnuclear whorls are marked by rather regular strong retractively curved ribs, which are about as wide as the spaces that separate them. Suture strongly impressed. Periphery obsoletely angulated. Base moderately broadly umbilicated, inflated, strongly rounded and marked by the continuation of the axial ribs which grow much stronger on the umbilical wall. Aperture very large, circular, with an angulation at the posterior angle; peristome simple; the outer lip thin, slightly effuse at the junction of the basal and outer lip; a little thickened on the inner lip. The parietal wall is covered by a thick callus, which renders the peritreme complete.

The type, U.S.N.M. No. 307425, was received from Sowerby and Fulton with the label "Brazil." It has 4.3 whorls and measures: Height, 17.3 mm.; greater diameter, 29.9 mm.; lesser diameter, 21.5 mm. Height of aperture, 12 mm.; diameter, 13.4 mm.

This species agrees with *A.* (*A.*) *amazonense* in having the base strongly axially ribbed but differs from it in having a much larger aperture.

APEROSTOMA (APEROSTOMA) AMAZONENSE, new species

Plate 35, Figures 4–6

Shell decidedly depressed-helicoid, almost planorbid. The entire upper surface is covered by a pale chestnut-brown periostracum. There is a faint lighter zone immediately above the periphery. The base is bicolor. The posterior half is a little darker than the upper surface of the shell, while the anterior half and umbilical wall are much lighter; interior of aperture bluish white. The nucleus consists of 2 small, well-rounded, smooth turns; the postnuclear whorls are moderately rounded, the last one deflected for a quarter of a turn. The postnuclear whorls are marked by retractively curved axial riblets, which are not quite as wide as the spaces that separate them. These riblets become decidedly enfeebled on the last portion of the last turn. Suture strongly impressed. Periphery weakly angulated. Base broadly umbilicated, inflated, strongly rounded and marked by strong axial ribs, which are more pronounced on the umbilical wall than on the rest. Aperture subcircular, slightly angulated at the posterior angle; peristome simple; the outer and inner lips both somewhat thickened and slightly reflected. The parietal wall is covered by a thick callus which renders the peritreme complete. The operculum is typically aperostomid and shows about 10 whorls.

The type, U.S.N.M. No. 356102, was collected by E. H. Short on the Amazon River in Brazil. It has 4.5 whorls and measures: Height, 13 mm.; greater diameter, 24 mm.; lesser diameter, 18.1 mm. Height of aperture, 9 mm.; diameter, 9.9 mm.

There are two additional lots, both bearing merely the label "Brazil"; U.S.N.M. No. 307425 contains one specimen and U.S.N.M. No. 316236, three specimens.

This species agrees with *A.* (*A.*) *fultoni* in having the base rather strongly axially ribbed, but it differs from it in having a much smaller aperture.

APEROSTOMA (APEROSTOMA) LAXATUM (Sowerby)

PLATE 35, FIGURE 13

1850. *Cyclostoma laxatum* SOWERBY, Thesaurus Conchyliorum, vol. 1, Suppl. p. 159*, pl. 31A, fig. 302.
1852. *Cyclotus laxatus* PFEIFFER, Monographia pneumonopomorum viventium, vol. 1, p. 18.
1897. *Neocyclotus* (*Neocyclotus*) *laxatus* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 137.
1923. *Poteria* (*Neocyclotus*) *laxatum* H. B. BAKER, Occ. Pap., Mus. Zool. Univ. Michigan, No. 137, p. 41.

Although *Cyclostoma laxatum* Sowerby has been quoted by many malacologists, we regret to say that we have none in the National Museum collection that agree with Sowerby's description, figure, and habitat; we must therefore quote Sowerby's description and copy his figure. His figure measures: Height, 18.5 mm.; greater diameter, 36.4 mm. Height of aperture, 13.1 mm.; diameter, 16.9 mm.

"Shell of a depressed orbicular form, whitish, covered with a thick orange-brown epidermis; spire depressed, with a rufous apex; volutions four, rounded, covered not only with distinct lines of growth, but also with irregular rugulosities, with two narrow zones, the posterior white, the other fuscous, in front of which the epidermis is more darkly coloured; aperture not quite circular, but very slightly elliptical, and with a slight angle posteriorly close to the last volution; peritreme thin, anteriorly very slightly reflected; umbilicus very large, showing internally the four volutions.

"The shell is somewhat diaphanous, so that the white and dark-brown zones are distinctly seen within the aperture.

"Columbia. *Mus. Cuming.*"

THE GROUP OF APEROSTOMA (APEROSTOMA) BLANCHETIANUM

Shell decidedly depressed.

APEROSTOMA (APEROSTOMA) BLANCHETIANUM (Moricand)

PLATE 35, FIGURES 7–9

1826. *Cyclostoma blanchetianum* MORICAND, Mem. Soc. Genéve, vol. 7, p. 442, pl. 2, figs. 21–23.
1847. *Aperostoma blanchetianum* TROSCHEL, Zeitsch. Malak., p. 44.
1847. *Aperostoma blanchetianum* PFEIFFER, Zeitsch. Malak., p. 104.
1850. *Cyclotus inca* (pars) GRAY, Nomenclature of molluscous animals and shells in the collection of the British Museum, pt. 1, p. 6.

1897. *Neocyclotus* (*Neocyclotus*) *inca* (pars) Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

1923. *Poteria* (*Neocyclotus*) *blanchetianum* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 44.

Shell depressed-helicoid. The early whorls, denuded of the periostracum, reddish; the later reddish horn colored, the last olivaceous on the upper surface. There is a narrow white zone at the periphery and a broad dark olivaceous band covering the posterior two-fifths of the base, the rest being horn colored; interior of aperture bluish white. The nucleus consists of 2 moderately large, well-rounded whorls. The postnuclear whorls are strongly rounded and marked by retractively curved, strong, small axial ribs, which are smaller than the spaces that separate them. On the last half of the last turn these riblets become much enfeebled and replaced by mere rough incremental lines. The suture is narrowly deeply channeled. Periphery very weakly angulated. Base broadly openly umbilicated, inflated, well rounded and marked by the continuation of the axial ribs, which grow considerably stronger on the umbilical wall. On the last half of the last whorl they become fused and more or less scalelike. Aperture circular, with a slight angulation at the posterior angle; peristome simple; the outer lip thin, slightly reflected; the inner slightly thickened and also slightly reflected. The parietal wall is covered by a rather thick callus, which renders the peritreme complete. Operculum typically aperostomid, with about 10 whorls.

The specimen described and figured is one of two, U.S.N.M. No. 98110, collected at Bahia, Brazil. It has 4.5 whorls and measures: Height, 15.2 mm.; greater diameter, 27.4 mm.; lesser diameter, 19.7 mm. Height of aperture, 9.9 mm.; diameter, 11.9 mm.

The following additional specimens are in the National Museum collections:

No. 104450, five specimens from Bahia received from Moricand; No. 307417, one specimen labeled "Brazil"; No. 381893, one specimen from the Amazon Valley. This species closely resembles *A.* (*A.*) *peruense* but is readily differentiated from it by its deeply incised narrow suture.

APEROSTOMA (APEROSTOMA) PERUENSE, new species

Plate 35, Figures 10–12

Shell very depressed-helicoid, almost planorbid; the upper surface dark horn colored. There is a light white band immediately above the periphery and a broad brilliant chestnut-brown zone immediately below the periphery. There is also a second, very narrow brown band separated from the broad band by a space about twice as wide as the narrow brown band. The rest of the base is horn colored.

The nucleus consists of 2 small, well-rounded, smooth turns; the postnuclear whorls are strongly rounded and marked by retractively curved, very regular axial riblets, which are a little narrower than the spaces that separate them. On the last half of the last turn the riblets become less pronounced and less regular. There are also some slight spiral markings on the upper surface. Suture strongly impressed. Periphery strongly rounded. Base broadly, openly umbilicated, inflated, and marked by the continuation of the axial ribs, which become a little intensified on the umbilical wall. Aperture broadly oval, with a slight auricle at the posterior angle; peristome simple; the outer lip of the peristome thin; the inner slightly thickened and reflected. The callus on the parietal wall is thick and renders the peritreme complete.

The type, U.S.N.M. No. 103999, comes from the Rich collection and bears the label "Peru." It has 4.2 whorls and measures: Height, 14.3 mm.; greater diameter, 26.8 mm.; lesser diameter, 18.2 mm. Height of aperture, 10.5 mm.; diameter, 12.3 mm.

This species can readily be differentiated from *A.* (*A.*) *blanchetianum* (Moricand) by its lacking the narrowly channeled suture.

APEROSTOMA (APEROSTOMA) LEAI, new species

PLATE 35, FIGURES 17–19

Shell very depressed-helicoid, almost planorbid. The upper surface is orange horn colored, with a little lighter zone at the summit and a broader white zone immediately above the periphery. The base bears a broad, bright, chocolate-brown band, which covers about one-third of the base anterior to the periphery. The rest is horn colored, with a narrow hydrophanous band on the middle of the base. Interior of aperture bluish white. The nucleus consists of 2 moderately large, well-rounded smooth turns. The postnuclear whorls are well rounded, the last half of the last whorl being slightly flattened below the suture. The postnuclear whorls are marked by retractively curved, very regular, rather closely spaced axial riblets, which are separated by spaces about as wide as the axial riblets. On the last part of the last turn these riblets become much enfeebled. Suture deeply impressed. Periphery feebly angulated. On the dark band below the periphery on the base the axial ribs are almost obsolete; they grow a little stronger on the rest of the base and are strongest on the umbilical wall. The umbilicus is broadly openly funnel-shaped. Aperture broadly oval, with a rather strong angulation at the posterior angle; peristome simple; outer lip thin and slightly outward reflected; the inner a little thicker. The parietal wall is covered by a rather thick callus which renders the peritreme complete. Operculum typically aperostomid, showing 6 whorls remaining.

The type, U.S.N.M. No. 104451, comes from Balsas, Peru. It was in the Lea collection. It has 4.3 whorls and measures: Height, 14.2 mm.; greater diameter, 27.5 mm.; lesser diameter, 19.2 mm. Height of aperture, 10.7 mm.; diameter, 12.3 mm.

The obsolete ribbing immediately below the periphery distinguishes this species from *A.* (*A.*) *peruense* and *A.* (*A*). *blanchetianum* (Moricand).

APEROSTOMA (APEROSTOMA) VENEZUELENSE, new species

PLATE 35, FIGURES 20–22

Shell very depressed-helicoid, thin, covered with an olivaceous periostracum, which is streaked and blotched with darker olive. There is a faint light zone immediately above the periphery and a broad weak brown band immediately below it. A second slender spiral line lies a little posterior to the middle of the base. The rest of the base is a little paler than the upper surface; interior of aperture bluish white. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are strongly rounded, the last one slightly deflected at its extremity. They are marked by obsolete axial riblets, which become quite irregular on the last whorl, where also some slight malleations are present. The last whorl is slightly flattened a little below the summit and the suture is deeply narrowly channeled. Periphery obsoletely angulated. Base openly broadly umbilicated, inflated, and marked by the same type of sculpture as that which characterizes the upper surface of the last whorl, except that on the umbilical wall the riblets become a little more distant. Aperture broadly oval, with a slight angulation at the posterior angle; peristome simple; the outer lip thin; the inner only slightly thickened. The parietal wall is covered by a moderately thick callus, which renders the peritreme complete.

The type, U.S.N.M. No. 307429, was collected by Cuming in Venezuela. It has 4.2 whorls and measures: Height, 14.7 mm.; greater diameter, 29.7 mm.; lesser diameter, 21 mm. Height of aperture, 11.3 mm.; diameter, 12.8 mm.

This species agrees with *A.* (*A.*) *depressum* (Da Costa) in having the axial ribs obsolete; it differs from that, however, in having the whorls strongly downward flexed near the suture and more rounded.

APEROSTOMA (APEROSTOMA) DEPRESSUM (Da Costa)

PLATE 35, FIGURES 14–16

1906. *Neocyclotus depressus* DA COSTA, Proc. Malac. Soc. London, vol. 7, p. 9, pl. 1, figs. 14–16.

1923. *Poteria* (*Neocyclotus*) *depressus* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 42.

Shell very depressed-helicoid, almost planorbid, covered by an olivaceous periostracum, with a moderately broad light zone immediately above the periphery and the posterior half of the base olivaceous-chestnut colored; the anterior half and the umbilicus are horn colored; interior of aperture bluish white. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are slightly rounded with a depression a little below the summit on the last half of the last turn. The postnuclear whorls are marked by obsolete, retractively curved axial riblets and faint traces of malleations in the depressed portion below the summit. Suture very strongly impressed. Periphery well rounded. Base broadly, openly umbilicated, inflated, well rounded, and marked by rather regular axial riblets, which become intensified on the umbilical wall. Aperture circular with an angulation at the posterior angle; peristome simple; the outer lip thin, the inner thin and slightly reflected. The parietal wall is covered with a thin callus rendering the peritreme complete. Operculum typically aperostomid, showing 8 whorls.

U.S.N.M. No. 250742 contains two specimens from Chanchamayo, Peru. The specimen described and figured has 4.5 whorls and measures: Height, 13.8 mm.; greater diameter, 26.4 mm.; lesser diameter, 19.5 mm. Height of aperture, 11 mm.; diameter, 12 mm.

This species resembles *A.* (*A.*) *venezuelense* in the obsolete ribbing, but differs from it in having the whorls much flatter on the upper surface and not inbent near the suture as in that form.

APEROSTOMA (APEROSTOMA) ECUADORENSE, new species

Plate 36, Figures 4–6

Shell helicoid, the early whorls reddish horn colored, the last horn colored. There is a lighter, very pronounced zone immediately above the periphery, and a darker zone, which gradually fades basally, occupying the posterior two-fifths of the whorl. The rest of the base is of about the same shade of horn color as the last whorl; interior of aperture bluish white, showing the external banding within. The nucleus consists of 2 moderately large, well-rounded, smooth turns. The postnuclear whorls are well rounded; the last one is gradually deflected for half of a turn. The postnuclear whorls are marked by quite regular, retractively curved, slightly flattened axial riblets, which are a little broader than the spaces that separate them. On the last part of the last turn these become somewhat weakened. Suture well impressed. Periphery rounded. Base narrowly umbilicated, inflated, strongly rounded, and marked by strong axial riblets, which are considerably stronger than those on the upper surface. Aperture oblique, subcircular, with a slight auricle at the posterior angle; peristome simple; outer lip thin, the inner thickened and slightly reflected. A strong callus covers the parietal wall and renders the peritreme complete. The operculum is typically aperostomid and shows 8 whorls.

The type, U.S.N.M. No. 316105, was collected by Cuming at Quito, Ecuador. It has 4.6 whorls and measures: Height, 23.3 mm.; greater diameter, 33.0 mm.; lesser diameter, 25.5 mm. Height of aperture, 14.5 mm.; diameter, 15.7 mm.

U.S.N.M. No. 307407 contains three topotypes, and U.S.N.M. No. 316110 contains another topotype.

This species is differentiated from the others of the group that have the axial ribs of the umbilical wall stronger than on the upper surface by its narrow umbilicus.

APEROSTOMA (APEROSTOMA) SUBCINGULATUM (Kobelt)

PLATE 36, FIGURES 1–3

1912. *Neocyclotus* (*giganteus?*) *subcingulatus* KOBELT, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, pt. 3, p. 892, pl. 133, figs. 4–6.

1923. *Poteria* (*Neocyclotus*) *subcingulatum* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 42.

Shell low, helicoid, covered with a reddish periostracum, which pales to chestnut-brown on the last turn. There is a very narrow light zone immediately above the periphery. The base is bicolor; the posterior portion covering about two-fifths of the base is dark chestnut-brown at the periphery and gradually pales anteriorly; the anterior portion is bright horn color. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are well rounded, the last one having a slight depression immediately below the summit. All but the last postnuclear whorls are marked by slender, retractively curved axial riblets, which are not so wide as the spaces that separate them. On the last whorl, however, these riblets grow consecutively weaker and become quite evanescent toward the end. Suture very strongly impressed. Periphery well rounded. Base broadly umbilicated, inflated, marked by the continuation of the axial riblets, which are weak at the periphery but grow stronger as they cross the base, being very strong on the umbilical wall. Aperture broadly oval, with a slight auricle at the posterior angle; peristome simple; the outer lip thin; the inner lip slightly thickened and slightly reflected. The parietal wall is covered by a moderately thick callus, which renders the peritreme complete.

The specimen described and figured, U.S.N.M. No. 98109, comes from Quito, Ecuador. It has 4.6 whorls and measures: Height, 19.5 mm.; greater diameter, 36.1 mm.; lesser diameter, 24.6 mm. Height of aperture, 14.7 mm.; diameter, 16.3 mm.

U.S.N.M. No. 366106 contains an additional specimen from Quito; U.S.N.M. No. 126907, one specimen collected by M. B. Kerr is labeled merely "Ecuador."

This species, which has the same type locality as *A.* (*A.*) *ecuadorense*, is of about the same size as that species but is more depressed, with a much larger umbilicus.

THE GROUP OF APEROSTOMA (APEROSTOMA) QUITENSE

Medium-sized shells, not decidedly depressed and having a rather large aperture.

APEROSTOMA (APEROSTOMA) QUITENSE (Pfeiffer)

PLATE 36, FIGURES 13–15

1852. *Cyclostoma* (*Cyclotus*) *quitense* PFEIFFER, Proc. Zool. Soc. London, vol. 20, p. 61.
1852. *Cyclotus quitensis* PFEIFFER, Monographia pneumopomorum viventium, vol. 1, p. 17.
1854. *Cyclostoma quitense* PFEIFFER, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 340, pl. 44, figs. 19–22.
1897. *Neocyclotus* (*Neocyclotus*) *quitensis* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 138.
1923. *Poteria* (*Neocyclotus*) *quitensis* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 43.

Shell rather large, low, helicoid, covered with a bright chestnut-brown periostracum. There is a pale, rather broad zone immediately above the periphery. The base is bicolor, having a broad, very dark chestnut-brown band immediately below the periphery, which extends over half of the base. The anterior half of the base, including the umbilical wall, is bright horn color; interior of aperture decidedly bluish, showing the external banding within. The nucleus consists of 2 well-rounded, smooth turns. The postnuclear whorls are well rounded, the last one is slightly impressed a little below the suture. They are marked with weak, retractively curved axial riblets. Suture strongly impressed. Periphery well rounded. The light band above the periphery produces an optical illusion of angulation. Base moderately broadly umbilicated, inflated, strongly rounded, and marked by the continuation of the feeble riblets on the posterior half, but from there on these riblets become much strengthened and are quite strong on the umbilical wall. Aperture broadly oval, with a rather strong auricle at the posterior angle; peristome simple; outer lip rather flaringly expanded and slightly reflected; inner lip somewhat thickened. The parietal wall is covered by a thick callus, which renders the peritreme complete. The operculum is typically aperostomid, showing 9 whorls.

The specimen described and figured, U.S.N.M. No. 307446, comes from Quito, Ecuador. It has 4.6 whorls and measures: Height, 20.8 mm.; greater diameter, 36.9 mm.; lesser diameter, 24.2 mm. Height of aperture, 14 mm.; diameter, 18.2 mm.

U.S.N.M. No. 307396 contains three topotypes collected by Cuming; U.S.N.M. No. 307431 contains another topotype from the Morelet collection.

This species is easily differentiated from A. (A.) *ecuadorense* and *subcingulatum* (Kobelt) by its smoother surface and much larger aperture.

APEROSTOMA (APEROSTOMA) OLIVACEUM, new species

PLATE 36, FIGURES 10–12

Shell low, helicoid, the early whorls pinkish, the last olivaceous with darker axial streaks, which are of irregular width and spacing. There is a light zone immediately above the periphery and a darker broad zone covering the posterior two-fifths of the base. The umbilical wall and the rest of the base are of the same color as the upper surface of the last turn; interior of the aparture bluish. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are well rounded; however, there is a depressed area a little below the summit. The postnuclear whorls are marked by retractively curved axial ribs, which are of about the same width as the spaces that separate them and which grow consecutively stronger as the shell increases in size. In addition, there are irregular, oblique scratches in the depressed area below the summit on the last turn and feeble indications of spiral markings on the rest of the last whorl. Suture strongly impressed. The periphery is well rounded. The light band, however, gives it the optical illusion of being angulated. Base narrowly umbilicated, inflated, strongly rounded, and marked by the continuaaion of the axial ribs, which become slightly stronger on the umbilical wall. Aperture very large, subcircular; peristome simple; outer lip thin; inner thickened. The parietal wall is covered by a very heavy callus which is slightly emarginated, and which renders the peritreme complete.

The type, U.S.N.M. No. 524084, comes from Ecuador. It has 4.6 whorls and measures: Height, 20.8 mm.; greater diameter, 34.2 mm.; lesser diameter, 23.1 mm. Height of aperture, 13.9 mm.; diameter, 16.6 mm.

U.S.N.M. No. 307423 contains a topotype.

This species in form and sculpture most nearly resembles A. (A.) *castaneum*, from which its much paler coloration easily distinguishes it.

APEROSTOMA (APEROSTOMA) CASTANEUM, new species

PLATE 36, FIGURES 7–9

Shell low, helicoid, bright chestnut-brown on the upper turns, with a light zone immediately above the periphery and a broad dark chestnut-brown band immediately below the periphery. The rest of the base is golden horn colored; interior of aperture bluish white, the edge buff colored. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are moderately rounded, well impressed a little anterior to the suture with a slender cord at the suture. The last whorl is decurrent for about one-quarter of a turn. The postnuclear whorls are marked by strong, retractively curved, very regular axial riblets, which become decidedly weakened on the last quarter of the last whorl. Suture strongly impressed. Periphery well rounded. Base moderately broadly, openly umbilicated, inflated, strongly rounded, and marked by the continuation of the axial ribs, which do not become stronger on the umbilical wall. Aperture very large, very broadly ovate with a slight angulation at the posterior angle; peristome simple; outer lip thin, decidedly produced on the outer lip and slightly reflected; inner lip slightly thickened. The parietal wall is covered by a moderately thick callus, which renders the peritreme complete.

The type, U.S.N.M. No. 524087, comes from Venezuela without specific locality. It has 4.4 whorls and measures: Height, 18.4 mm.; greater diameter, 32.2 mm.; lesser diameter, 21.4 mm. Height of aperture, 12.3 mm.; diameter, 15.7 mm.

This species resembles *A.* (*A.*) *olivaceum* but differs from it in having the axial sculpture much stronger and the last whorl decidedly decurrent and in being of much darker coloration.

APEROSTOMA (APEROSTOMA) PERUVIANUM (Da Costa)

PLATE 36, FIGURES 16–18

1906. *Neocyclotus peruvianus* DA COSTA, Proc. Malac. Soc. London, vol. 7, p. 98, pl. 11, figs. 7–9.

1923. *Poteria* (*Neocyclotus*) *peruvianus* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 42.

We have not seen specimens of this species and so give a translation of Da Costa's description and copy his figures:

Shell large, openly umbilicated, depressed, grayish brown with a narrow yellowish band above the periphery. The base bears a broad dark band. Whorls 4.5, convex, impressed at the suture, obliquely rib-striated. Aperture obliquely circular, bluish white. Greater diameter, 38 mm.; lesser diameter, 29 mm.

Type locality: Pozuzo, eastern Peru.

Da Costa further adds: "There is a certain resemblance between this shell and *N. cingulatus*, Sowb., from Colombia, but it is less openly umbilicated and not so strongly striated. The different geographical distribution of the two species should be sufficient to distinguish them. The shelly operculum is thick and consists of 8–9 whorls, which are thickened at the inner edge."

The very broad umbilicus will distinguish this from the other members whose last whorl is not finely regularly ribbed.

APEROSTOMA (APEROSTOMA) SALENGOENSE, new species

Plate 37, Figures 18–20

Shell low, helicoid; the denuded early whorls pinkish, the later turns soiled white. Where the periostracum remains this is shown to be golden-yellow on the upper surface. There is a narrow light zone at the periphery and the base has a broad, dark, colored band covering two-fifths of its surface. Anterior to this, including the umbilical wall, the base has a horncolored periostracum; interior of the aperture bluish white. The nucleus consists of 2 small, well-rounded, smooth turns, forming a rather pointed apex. The postnuclear whorls are well rounded, with a slightly impressed area a little below the suture on the last turn and a weak cord at the summit, which is appressed to the preceding turn. The postnuclear whorls are marked by rather irregular, poorly developed, retractively slanting axial riblets which become evanescent on the last part of the last turn. Suture strongly impressed. Periphery feebly angulated. Base moderately openly umbilicated, inflated, well-rounded, and marked by the same type of sculpture as that which characterizes the upper surface. Aperture broadly oval with a slight auricle at the posterior angle; peristome simple; the outer lip produced at its junction with the basal lip and slightly reflected, thin; the inner slightly thickened. The parietal wall is covered by a thick callus, which is separated from the preceding turn by an impressed groove, which renders the peritreme complete.

The type, U.S.N.M. No. 104432, was collected by Cuming at Salengo Island, Ecuador. It has 4.6 whorls and measures: Height, 21.5 mm.; greater diameter, 37.4 mm.; lesser diameter, 25.4 mm. Height of aperture, 13.5 mm.; diameter, 17.7 mm.

The appressed summit distinguishes this species from the other members of the group having a moderately broad umbilicus.

APEROSTOMA (APEROSTOMA) MASVENSE, new species

Plate 37, Figures 1–3

Shell helicoid. The denuded early whorls pinkish, the rest olivaceous with a brownish tinge. There are also irregular axial streaks of a darker shade. There is a narrow light zone immediately above the periphery and a broad dark band about one-fifth of the width of the base anterior to the periphery. The rest of the base is olivaceous horn colored; interior of the aperture bluish, showing the dark band within. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are strongly rounded, the last one decurrent for some little distance behind the aperture, having a strongly impressed groove a little anterior to the summit. The postnuclear whorls are marked by rather coarse, retractively curved, and somewhat irregularly developed axial riblets, which become decidedly weakened on the last quarter of the last turn. In the groove below the summit there are oblique scratches. Sutures very strongly impressed, almost channeled. Periphery obsoletely angulated. Base narrowly openly umbilicated, inflated, strongly rounded, and marked by the continuation of the axial ribs, which increase but slightly on the umbilical wall. Aperture subcircular with a conspicuous angulation at the posterior angle; peristome simple; outer lip thin, slightly expanded; the inner lip somewhat thickened. The parietal wall is covered by a thick callus, which is separated from the preceding turn by an impressed line, which renders the peritreme complete.

The type, U.S.N.M. No. 524048, was collected by Oscar Haught at Cerro Masve, Guayas Province, Ecuador. It has 4.5 whorls and measures: Height, 18.9 mm.; greater diameter, 30.2 mm.; lesser diameter, 21.1 mm. Height of aperture, 11.8 mm.; diameter, 14.1 mm.

U.S.N.M. No. 524049 contains 15 topotypes from the same source.

The more elevated spire will readily distinguish this species from *A.* (*A.*) *agassizi*, which also has the axial sculpture comparatively stronger.

APEROSTOMA (APEROSTOMA) AGASSIZI, new species

Plate 37, Figures 4–6

Shell depressed-helicoid; the early denuded whorls pink; the last covered with a chestnut-brown periostracum, which is paler on the early whorls than on the last. There is a small white zone immediately above the periphery, and a broad dark chestnut brown band, which covers about a quarter of the base immediately below the periphery. The rest of the base is yellowish horn colored. The nucleus consists of 2 rather large, well-rounded, smooth turns. The postnuclear whorls are moderately well rounded, the last one having a depressed area a little anterior to the summit. The summit itself, at least on the last whorl, shows like a cord. The postnuclear whorls are marked by retractively slanting axial riblets, which on the penultimate whorl are about as wide as the spaces that separate them; on the last half of the last whorl they gradually become weakened and finally evanescent. Suture very conspicously impressed. Periphery of the last whorl feebly angulated. Base narrowly umbilicated, inflated, strongly rounded, and marked by the continuation of the axial ribs which become irregular and rather poorly emphasized on the umbilical wall. Aperture large with a moderately conspicuous angulation at the posterior angle; peristome simple; outer lip rather produced, thin; the inner slightly thickened. The parietal wall is covered by a thick callus, which is separated from the preceding turn by an impressed line, rendering the peritreme complete.

The type, U.S.N.M. No. 57285, was collected by Louis Agassiz in Brazil, probably in the Amazon River region, since the Agassiz expedition covered that field. It had 4.4 whorls and measures: Height, 15.7 mm.; greater diameter, 28.3 mm.; lesser diameter, 19 mm. Height of aperture, 11.1 mm.; diameter, 13.7 mm.

This species is readily distinguished from *A.* (*A.*) *nevadense* by its deeply impressed suture.

APEROSTOMA (APEROSTOMA) NEVADENSE, new species

Plate 37, Figures 15–17

Shell helicoid, the upper surface covered by a brownish olivaceous periostracum, which on the last half of the last turn becomes olive. There is a narrow, faint, spiral, lighter zone immediately above the periphery. The base has a pale olivaceous-brown band covering one-fifth of the base, anterior to the periphery. The rest is olivaceous horn colored. The nucleus consists of 2, rather large, well-rounded, smooth turns. The post-nuclear whorls are well rounded, the last one is slightly flattened toward the suture. The postnuclear whorls are marked by very poorly developed, irregular, somewhat wavy axial riblets. Suture weakly impressed. On the last half of the last turn the riblets become decidedly irregular and almost obsolete. Periphery obsoletely angulated. Base narrowly umbilicated, inflated, well rounded, and marked by irregularly developed and spaced riblets, which give it a rough surface, even rougher than the spire. Aperture broadly oval, weakly angulated at the posterier angle; peristome simple; the outer lip thin; the inner slightly thickened and slightly reflected. The parietal wall is covered by a moderately thick callus, which renders the peritreme complete.

The type, U.S.N.M. No 206494, was collected by Gabaldon and sons at an altitude of 8,400 ft., in the Sierra Nevada Mountains, Venezuela. It has 4.3 whorls and measures: Height, 15.8 mm.; greater diameter, 28.5 mm.; lesser diameter, 19.3 mm. Height of aperture, 10.9 mm.; diameter, 13 mm.

The rough irregular sculpture and weakly impressed suture will readily differentiate this species from *A.* (*A.*) *agassizi*.

THE GROUP OF APEROSTOMA (APEROSTOMA) FASCIATUM

Small shells with rather narrow umbilicus and small aperture.

APEROSTOMA (APEROSTOMA) FASCIATUM (Kobelt)

Plate 37, Figures 7–9

1912. *Neocyclotus popayanus fasciata* Kobelt, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, pt. 3, p. 900 (pl. 7, figs. 7–10), pl. 139, figs. 1–5.

1923. *Poteria* (*Neocyclotus*) *popayana fasciata* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, 40, 44.

1923. *Poteria* (*Neocyclotus*) *dunkeri* var. approaching *P. popayana* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, pp. 40, 45, pl. 5, fig. T.

Shell small, helicoid, covered with an olivaceous-brown periostracum, which fades to olivaceous on the last portion of the last turn. In addition, there is a pale band immediately above the periphery and indications of additional inconspicuous spiral lighter zones on the upper surface. There is a dark band of brown about one-fifth width of base immediately anterior to the periphery and in addition to that lesser spiral bands of brown on the anterior half of the base; the rest is olivaceous horn colored; the interior of aperture is bluish white. The nucleus consists of 2 moderately large, well-rounded, smooth turns. The postnuclear whorls are well elevated, inflated, and strongly rounded. The last one is deflected below the periphery for almost a turn. The postnuclear whorls are marked by feeble, retractively curved, hairlike riblets, which become much enfeebled on the last quarter of the last turn. Suture strongly impressed. Periphery well rounded. Base narrowly umbilicated, inflated, well rounded and marked by the feeble continuation of the axial ribs on the posterior half; on the anterior half and the umbilical wall the axial ribs become very much intensified. Aperture rather small, circular, with a slight angulation at the posterior angle; peristome simple; the outer lip slightly flaringly expanded; the inner somewhat thickened. A moderately thick callus covers the parietal wall. It is separated from the preceding turn by an impressed line and renders the peritreme complete. Operculum typically aperostomid, showing 9 whorls.

The specimen described and figured is one of two, U.S.N.M. No. 57766, which comes from Puerto Cabello, Venezuela. It has 4.3

whorls and measures: Height, 16 mm.; greater diameter, 21.8 mm.; lesser diameter, 16.3 mm. Height of aperture, 9.4 mm.; diameter, 10.3 mm.

U.S.N.M. No. 316273 contains 2 additional specimens labeled "Venezuela."

While this species resembles *A.* (*A.*) *pazi* (Crosse) in having the last whorl deflected, it can be distinguished from it in being much darker in coloration and in having the umbilicus narrower.

APEROSTOMA (APEROSTOMA) PAZI (Crosse)

PLATE 37, FIGURES 12–14

1866. *Cyclotus pazi* CROSSE, Journ. Conchyl., vol. 14, p. 356, pl. 14, fig. 3.

1897. *Neocyclotus* (*Neocyclotus*) *pazi* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

1923. *Poteria* (*Neocyclotus*) *pazi* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 41.

Shell small, helicoid, covered by an olivaceous periostracum, the early whorls of which have a brownish tinge. There are irregular streaks of darker axial bands present. There is a narrow pale zone immediately posterior to the periphery and a weak brownish band about one-quarter the width of the base anterior to the periphery. The rest of the base is horn colored; interior of aperture bluish white. The nucleus consists of two moderately large, well-rounded, smooth turns. The postnuclear whorls are strongly rounded; the summit of the last one falls very materially below the periphery of the preceding turn. The postnuclear whorls are marked by fairly strong, retractively slanting axial riblets, which are about as wide as the spaces that separate them. On the last half of the last turn these riblets become very irregular, more or less fused, and quite obsolete on the last portion. Periphery obsoletely angulated. Base moderately broadly umbilicated, inflated, strongly rounded, and marked by the continuation of the axial sculpture, which becomes a little heavier and more irregular on the umbilical wall. Aperture almost circular, very slightly angulated at the posterior angle; peristome simple; outer lip thin; inner lip slightly thickened. The parietal wall is covered by a moderately thick callus which is separated from the preceding turn by an impressed line rendering the peritreme complete.

U.S.N.M. No. 307401 contains two specimens, one of which has served for our figure. They were collected by Cuming on Chimborazo, Ecuador. The specimen figured has 4¼ whorls and measures: Height, 11 mm.; greater diameter, 22 mm.; lesser diameter, 18.5 mm. Height of aperture, 9.5 mm.; diameter, 9.9 mm.

This species resembles *A.* (*A.*) *fasciatum* (Kobelt) in having the last whorl decidedly deflected but differs from it in being much paler and in having the umbilicus wider.

APEROSTOMA (APEROSTOMA) CAUCAENSE (Da Costa)

PLATE 37, FIGURES 10, 11

1901. *Neocyclotus caucaensis* DA COSTA, Proc. Malac. Soc. London, vol. 4, p. 240, pl. 24, fig. 9.

1923. *Poteria* (*Neocyclotus*) *caucaensis* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 41.

We have not seen specimens of this species and so give a translation of Da Costa's description and copy his figure:

Shell moderately profoundly umbilicated, subdiscoid, vivid olivaceous green with the interior of the aperture white and narrowly banded at and below the periphery. Whorls 4, impressed at the suture; the last canaliculate below. Aperture circular; peristome thin, with a cut in the basal lip. Greater diameter, 30 mm.; lesser, 23.5 mm.

Habitat: Province of Cauca, Colombia.

Da Costa then adds: "Of the two specimens received of this singular shell one was returned by the writer in hopes that others might be discovered, but without result. In both of the shells sent the fissure on the lip occurs in precisely the same place, just below the shallow canal that surrounds the base; a similar fissure is found in *N. giganteus*, var. *Fischerianus*, Hid., from Ecuador, but that form has no canal on the base."

This species looks to us as if its peculiarities were due to an injury; however, not having seen it or anything like it, we merely cite it as described and figured.

APEROSTOMA (APEROSTOMA) COLOMBIENSE (Da Costa)

PLATE 38, FIGURES 22–24

1901. *Neocyclotus colombiensis* DA COSTA, Proc. Mal. Soc. London, vol. 4, p. 240, pl. 24, fig. 7 (not *Cyclostoma colombiensis* Férussac MS., Orbigny, 1835).

1923. *Poteria* (*Neocyclotus*) *colombiensis* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 43.

Shell helicoid, the upper portion brownish olivaceous. There is a narrow light band immediately above the periphery and a narrow dark chestnut-colored band immediately below the periphery. There is a second dark chestnut-colored band of the same intensity and width on the middle of the base. Between these two there are numerous slender, spiral hairlines of dark brown. The rest of the base is olivaceous horn colored; interior of aperture bluish white. The nucleus consists of 2 rather large, well-rounded, small turns. The postnuclear whorls are strongly rounded; the last one drops considerably below the periphery of the preceding turn and bears a conspicuous rounded cord at the appressed summit. Below this cord is an impressed groove. The postnuclear whorls are marked by retractively curved feeble riblets, which are rather irregular in strength and spacing, and which become weaker on the last turn and obsolete on the last portion thereof. Suture well impressed. Periphery weakly angulated. Base narrowly umbilicated, inflated, strongly rounded, and marked by the continuation of the feeble axial sculpture, which, however, develops into stronger and broader riblets on the umbilical wall. Aperture circular with a moderately strong angulation at the posterior angle; peristome simple; outer lip thin, slightly expanded and slightly reflected; inner lip moderately thickened. The parietal wall is covered by a heavy callus, which is strongly separated from the preceding turn and renders the peritreme complete.

The specimen described and figured, U.S.N.M. No. 307432, was received from Sowerby and Fulton with the designation "New Grenada" (Colombia). It has 4.4 whorls and measures: Height, 18.7 mm.; greater diameter, 27.7 mm.; lesser diameter, 20.2 mm. Height of aperture, 11 mm.; diameter, 12.8 mm.

Da Costa's figure yields the following measurements: Height, 21.1 mm.; greater diameter, 33.5 mm.; lesser diameter, 24.7 mm. Height of aperture, 13.4 mm.; diameter, 14.9 mm. It has 5 whorls.

This species recalls *A.* (*A.*) *caucaense* (Da Costa) but lacks the basal sinus or configuration described therefor. It also suggests *A.* (*A.*) *perezi* (Hildalgo), but is much larger than that species.

APEROSTOMA (APEROSTOMA) PEREZI (Hidalgo)

PLATE 38, FIGURES 4–6

1866. *Cyclotus perezi* HILDAGO, Journ. Conchyl., vol. 14, p. 344, pl. 14, fig. 2.
1897. *Neocyclotus* (*Neocyclotus*) *perezi* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 137.
1923. *Poteria* (*Neocyclotus*) *perezi* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 43.

Shell small, depressed-helicoid, the upper surface bright reddish chestnut-brown. There is a very inconspicuous, narrow, slightly lighter zone immediately above the periphery. The base has a broad dull chestnut-brown band immediately below the periphery and another narrow one of the same shade on the middle of the base. The rest is a little paler than the upper surface. The nucleus consists of 2 moderately large, well-rounded, smooth turns. The postnuclear whorls are inflated, strongly rounded, almost flattened at the summit. The summit of the last one falls slightly below the periphery of the preceding turn. The postnuclear whorls are marked by regular fine riblets. Suture strongly constricted. Periphery well rounded. Base openly umbilicated and marked by the continuation of the axial riblets, which become a little less strong on the umbilical wall. Aperture circular with a slight angulation at the posterior angle; peristome simple; outer lip thin and the inner slightly thickened. The parietal wall is covered by a moderately strong callus which renders the peritreme complete.

U.S.N.M. No. 316104 contains two specimens from Quito, Ecuador. The one figured has 4 whorls and measures: Height, 13.8 mm.; greater diameter, 24.5 mm.; lesser diameter, 16.8 mm. Height of aperture, 10.2 mm.; diameter, 11.1 mm.

The small size and more depressed form readily distinguish this species from *A.* (*A.*) *colombiense* (Da Costa), and the regular ribbing of the upper surface differentiates it from *A.* (*A.*) *redfieldi.*

APEROSTOMA (APEROSTOMA) BOLIVIENSE, new species

PLATE 38, FIGURES 7–9

Shell helicoid, covered with a chestnut-brown periostracum, which is a little paler near the suture than on the major portion of the turns. There is a narrow, inconspicuous, lighter zone immediately above the periphery. The base is marked by a broad chestnut-brown band, which gradually fades from the periphery basally. This is separated by a narrow band, which is about twice as wide as the narrow dark chestnut-brown band below it, which occupies the middle of the base. The general coloration of the base is olivaceous horn colored; interior of aperture bluish white. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are strongly rounded; the summit of the last one gradually falls below the periphery of the preceding turn. The postnuclear whorls are marked by rather strong, retractively curved axial riblets, which grow somewhat weaker and irregular on the last part of the last whorl. Suture very deeply impressed. Periphery obsoletely angulated. Base narrowly umbilicated, inflated, strongly rounded and marked by the continuation of the axial ribs, which grow very slightly stronger on the umbilical wall. Aperture broadly oval, produced at the junction of the basal and outer lip; peristome simple; outer lip sharp; inner somewhat thickened. The parietal wall is covered by a thick callus, which is separated from the preceding turn by a deeply impressed groove which renders the peritreme complete.

The type, U.S.N.M. No. 307426, was received from Sowerby and Fulton with the designation "*Neocyclotus inca* Orbigny var. *Minor* Pfeiffer" and the locality "Bolivia." It has 4.2 whorls and measures: Height, 14.5 mm.; greater diameter, 23.9 mm.; lesser diameter, 16.5 mm. Height of aperture, 9.7 mm.; diameter, 10.9 mm.

U.S.N.M. No. 524102 contains one topotype from the same source.

This species resembles *A.* (*A.*) *redfieldi*. It has the suture much more profoundly impressed and the median basal dark band more nearly on the middle of the base.

APEROSTOMA (APEROSTOMA) REDFIELDI, new species

Plate 38, Figures 10–12

Shell small, helicoid. The upper surface is dark chestnut-brown. There is a broad light band immediately above the periphery, while below the periphery there is a broad dark chestnut-brown band about twice as wide as the light zone above, and a second narrow band occupies the base a little posterior to the middle. The rest of the base is olivaceous, with a brownish tinge; interior of the aperture bluish white. The nucleus consists of about 2 well-rounded, smooth turns. The postnuclear whorls are well rounded; the last one is appressed as a feeble cord at the summit, below which there is an impressed groove. The postnuclear whorls are marked by feeble, poorly developed axial riblets which are of irregular size and spacing. On the last part of the last turn they become quite obsolete. The summit of the last whorl falls slightly below the periphery of the preceding turn. Periphery obscurely angulated. Base narrowly umbilicated, inflated, strongly rounded, and marked by the continuation of the axial ribs, which do not appear to grow stronger on the umbilical wall. Aperture almost circular, slightly angulated at the posterior angle; peristome simple; the outer lip sharp; the inner slightly thickened. The parietal wall is covered by a thick callus, which is separated from the preceding turn by a strongly impressed groove, which renders the peritreme complete.

The type, U.S.N.M. No. 307399, comes from Brazil. It has 4.5 whorls and measures: Height, 14.5 mm.; greater diameter, 23.6 mm.; lesser diameter, 16.7 mm. Height of aperture, 8.5 mm.; diameter, 10.3 mm.

This species is very closely related to *A.* (*A.*) *boliviense* but has the height of the aperture proportionately smaller. The color band also occupies a different position. In *A.* (*A.*) *boliviense* it is on the middle of the base, while in this species it is more posterior. *A.* (*A.*) *boliviense* also has the suture much more strongly impressed.

APEROSTOMA (APEROSTOMA) CURRANI, new species

Plate 38, Figures 1–3

Shell helicoid, soiled white when denuded. The fragments of the periostracum remaining in the specimen before us show a golden-brown tint on the upper surface with a dark subperipheral band on the base. The nuclear whorls are decollated in our specimen. The postnuclear whorls are well rounded and marked by retractively slanting axial riblets. Suture strongly impressed. Periphery obscurely angulated. Base moderately broadly umbilicated, inflated, well rounded, with the axial riblets growing a little stronger on the umbilical wall. Aperture subcircular; peristome simple; outer lip slightly expanded and reflected; inner moderately thickened. The parietal wall is covered by a rather heavy callus, which is separated from the preceding turn by an impressed line.

The type, U.S.N.M. No. 322360, was collected by H. M. Curran on the Rio Gregugy, Bahia, Brazil. It has a little more than 2 whorls remaining and measures: Height, 16 mm.; greater diameter, 27.5 mm.; lesser diameter, 10.8 mm. Height of aperture, 12.1 mm.

We dislike to describe imperfect material as new species but are making an exception in this case because the specimen in question represents an element completing the range of the group to which it belongs.

The species can be easily differentiated from *A.* (*A.*) *merrilli* by its larger size.

APEROSTOMA (APEROSTOMA) NANUM, new species

PLATE 38, FIGURES 13–15

Shell small, helicoid; the upper surface horn yellow with a narrow light zone immediately above the periphery. Below the periphery there is a narrow blackish-brown zone. The rest of the base is of the same color as the upper surface. The nucleus consists of 2 well-rounded, smooth turns. The postnuclear whorls are well rounded; the last one has an inconspicuous cord at the summit immediately adjacent to which is an impressed groove. The summit of the last half turn of the last whorl is gradually deflected until it falls below the dark subperipheral band. The postnuclear whorls are marked by retractively slanting axial riblets, which are about as wide as the spaces that separate them. Suture very strongly impressed. Periphery obscurely angulated. Base narrowly umbilicated, inflated, well rounded, marked by the continuation of the axial ribs, which become very much enfeebled on the last half. These axial riblets become stronger on the umbilical wall. Aperture circular, slightly angulated at the posterior angle; peristome simple; outer lip thin; inner lip somewhat thickened. The narrow parietal wall is covered by a thick callus which renders the peritreme complete.

The type, U.S.N.M. No. 336128, was collected by H. Pittier on the coastal range somewhere between sea level and 200 meters between Caracas and Puerto Cabello, Venezuela. It has 4 whorls and measures: Height, 13.8 mm.; greater diameter, 21.7 mm.; lesser diameter, 15.3 mm. Height of aperture, 8.5 mm.; diameter, 10.1 mm.

The small size and pale coloration readily distinguish this species from the other members of the group.

APEROSTOMA (APEROSTOMA) MERRILLI, new species

Plate 38, Figures 19–21

Shell low, helicoid. The upper surface olivaceous, with a brownish tinge. There is a broad light zone immediately above the periphery and a broad dark zone covering about two-fifths of the base immediately below the periphery. The rest of the base is a little paler than the upper surface. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are strongly rounded. The last one is gradually deflected until it falls about halfway across the dark subperipheral band at the aperture. The postnuclear whorls are marked by retractively curved, slender axial riblets, which are not quite as wide as the spaces that separate them. These riblets become somewhat confused and irregular on the last half of the last turn. Suture strongly impressed. Periphery obscurely angulated. Base openly, rather broadly umbilicated, inflated, strongly rounded, and marked by the continuation of the axial riblets, which become obsolete on the umbilical wall. Aperture almost circular with a slight angulation at the posterior angle; peristome simple; outer lip thin; inner slightly thickened. The parietal wall is covered by a moderately thick callus which renders the peritreme complete.

The type, U.S.N.M. No. 58310 comes from Brazil. It has 4.3 whorls and measures: Height, 14.6 mm.; greater diameter, 23.7 mm,; lesser diameter, 17 mm. Height of aperature, 9.5 mm.; diameter, 10.9 mm.

U.S.N.M. No. 203708 contains five not quite perfect specimens obtained by H. B. Merrill on the Braganza Railway in the Amazon Valley; U.S.N.M. No. 57286 contains another specimen obtained by the Agassiz Expedition to Brazil.

The larger size, darker coloration, and the feeble sculpture on the umbilical wall readily distinguish this species from *A.* (*A.*) *nanum.*

APEROSTOMA (APEROSTOMA) PULCHELLUM, new species

Plate 38, Figures 16–18

Shell small, depressed-helicoid, thin. The early whorls with a pinkish tinge; the later pale horn colored. There is an inconspicuous light zone immediately above the periphery and a moderately broad chestnut band immediately below it. The rest of the base is colored like the upper surface of the last whorl. The nucleus consists of 2 rather large, well-rounded, smooth turns. The postnuclear whorls are well rounded, slightly flattened toward the summit, or even somewhat inbent. The summit of the last turn gradually falls below the periphery of the preceding turn at the aperture, and is more than the width of the brown band below the brown band. The postnuclear whorls are marked by feeble axial riblets, which are merely indicated on the last half of the last turn. Suture very deeply impressed. Base broadly openly umbilicated, somewhat inflated, well rounded and marked by the continuation of the axial ribs, which do not become intensified on the umbilical wall. Aperture very large; peristome simple; outer lip expanded and slightly reflected; inner lip slightly thickened. A very heavy callus covers the parietal wall, from which it is separated by a strongly impressed groove, which renders the peritreme complete. Operculum typically aperostomid, showing 9 whorls.

The type, U.S.N.M. No. 524125, comes from Brazil. It has 4.3 whorls and measures: Height, 12.1 mm.; greater diameter, 22.1 mm.; lesser diameter, 15 mm. Height of aperture, 6.9 mm.; diameter, 10.5 mm.

The pale coloration, obsolete supraperipheral light zone, and feeble axial sculpture on the umbilical wall readily differentiate this species from *A.* (*A.*) *merrilli.*

APEROSTOMA (APEROSTOMA) POPAYANUM (Lea)

PLATE 39, FIGURES 17–19 (type), 20–22

1839. *Cyclostoma popayana* LEA, Trans. Amer. Phil. Soc., new ser., vol. 6, p. 94, pl. 23, fig. 76.

1847. *Aperostoma popayanum* PFEIFFER, Zeitsch. f. Malak., vol. 4, p. 104.

1852. *Cyclotus popayanus* PFEIFFER, Monographia pneumonopomorum viventium, vol. 1, p. 21.

1897. *Neocyclotus* (*Neocyclotus*) *popayanus* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

1923. *Poteria* (*Neocyclotus*) *popayana* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 44.

Shell helicoid, the upper surface olivaceous horn colored with axial streaks of darker shades, which are of irregular size and spacing. There is a narrow light zone immediately above the periphery and a brownish olivaceous band below the periphery, which gradually fades basally. The rest of the base is horn colored. The nucleus consists of 2 small, well-rounded, smooth turns, forming a rather elevated spire. The postnuclear whorls are well rounded; the last one slightly deflected below the periphery, forming a weak cord at the appressed summit, below which there is an impressed groove. The postnuclear whorls are marked by retractively curved slender axial riblets, which are narrower than the spaces that separate them, and which on the last turn become rather irregular. Here, too, there are oblique scratches in the depressed area below the summit and, to a lesser extent, on the rest of the whorl. Periphery obscurely angulated. Base narrowly umbilicated, and marked by the feeble continuation of the axial ribs, which do not become intensified on the umbilical wall. Aperture circular with a conspicuous angulation at the posterior angle; peristome simple; outer lip thin, somewhat expanded and slightly reflected on the basal half; slightly thickened on the inner lip with the parietal wall covered by a moderately thick callus which is separated from the preceding turn by an impressed line, which renders the peritreme complete. Operculum typically aperostomid, showing 9 whorls.

Lea's type, U.S.N.M. No. 104453, was collected by Dr. Gibbons near Popayan, Grenada (that is, southwest Colombia). It has 4.2 whorls and measures: Height, 14.7 mm.; greater diameter, 22.6 mm.; lesser diameter, 16 mm. Height of aperture, 9.8 mm.; diameter, 10.7 mm.

A second specimen with the type and bearing the same number is considerably larger but in every way similar to the dead denuded type. It measures: Height, 18.4 mm.; greater diameter, 27.5 mm.; lesser diameter, 19 mm. Height of aperture, 10.8 mm.; diameter, 12.6 mm. It has 4.6 whorls.

We have also figured one of two specimens received from Bland, U.S.N.M. No. 307406, collected at Marmato, New Grenada (southwestern Colombia). It has 4.4 whorls and measures: Height, 15.4 mm.; greater diameter, 23.5 mm.; lesser diameter, 17 mm. Height of aperture, 10.4 mm.; diameter, 10.8 mm.

U.S.N.M. No. 356029 contains two young specimens from New Grenada.

This species appears nearest related to *A.* (*A.*) *balsasense*, from which it can readily be differentiated by the scratched surface of the last whorl, which is not present in *balsasense*.

APEROSTOMA (APEROSTOMA) BALSASENSE, new species

PLATE 39, FIGURES 1–3

Shell depressed-helicoid. The early whorls are flesh colored; the last two horn colored with a brownish flush. There is a very narrow light zone immediately above the periphery and a broad dark zone below the periphery which extends from the periphery to almost the middle of the base, gradually fading anteriorly. The anterior portion and umbilical wall are horn colored; the interior of the aperture is flesh white and shows the external banding. The nucleus consists of 2 small, well-rounded, smooth turns. The postnuclear whorls are well rounded, appressed at the summit and marked on the penultimate whorl by very regular and regularly spaced retractively curved axial ribs. These ribs are about as wide as the spaces that separate them. On the last whorl the riblets become somewhat irregular and toward the end evanescent. The summit of the last whorl drops slightly below the periphery. Base openly umbilicated, inflated, well rounded, and marked by the feeble continuation of the axial ribs, which almost vanish on the umbilical wall. Aperture circular, with a slight angulation at the posterior angle; peristome simple; outer lip very thin; inner slightly thickened. The parietal wall is covered with a thin callus which renders the peritreme complete.

The type, U.S.N.M. No. 524126, comes from Balsas, Peru. It has 4 whorls and measures: Height, 13.8 mm.; greater diameter, 23.3 mm.; lesser diameter, 16.4 mm. Height of aperture, 9.3 mm.; diameter, 10.2 mm. A topotype has the U.S.N.M. No. 524127.

This species resembles most nearly *A.* (*A.*) *popayanum* (Lea), from which the feeble basal sculpture and stronger ribs on the upper surface will readily distinguish it as well as the absence of strong scratching on the last whorl.

APEROSTOMA (APEROSTOMA) CARDOZI (H. B. Baker)

PLATE 39, FIGURES 4–6

1923. *Poteria* (*Neocyclotus*) *dunkeri cardozi* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, pp. 43, 44, pl. 5, fig. R.

Shell small, depressed-helicoid, horn colored, with a broad brownish band extending from the periphery over the anterior two-fifths of the base. This band is bordered on each side by a narrow darker zone, and there is an obsolete stripe of this darker coloration midway between these two in the specimen figured. The basal portion is a little paler than the upper surface; interior of aperture bluish white. The nucleus consists of 2 well-rounded, smooth turns. The postnuclear whorls are somewhat inflated, well rounded, and marked by retractively curved, moderately rough incremental lines, which develop into irregular obsolete riblets on the last half turn. Suture strongly impressed. Periphery obsoletely angulated. Base openly umbilicated, inflated, well rounded and marked like the upper surface. Aperture circular; peristome simple, thin, sharp. The parietal wall is covered by a moderately thick callus. Operculum typically aperostomid, showing 7 whorls.

The specimen described and figured is one of two lent by Professor Goodrich for examination. It comes from La Fria, Venezuela. It is a topotype having 3.7 whorls and measures: Height, 8.9 mm.; greater diameter, 16.5 mm.; lesser diameter, 11.7 mm. Height of aperture, 7 mm.; diameter, 7.3 mm.

Baker's type has 3.7 whorls and measures: Height, 9.4 mm.; greater diameter, 17 mm. Height of aperture, 7.5 mm.; diameter, 7.5 mm.

This species appears most nearly related to *A.* (*A.*) *balsasense* but can readily be differentiated from it by its much smaller size.

APEROSTOMA (APEROSTOMA) INCA (Orbigny)

Plate 39, Figure 12

1835. *Cyclostoma inca* Orbigny, Mag. Zool., p. 29.
1837. *Cyclostoma inca* Orbigny, Voyage dans l'Amérique méridionale . . ., vol. 5, p. 361, pl. 46, figs. 21–23.
1843. *Cyclostoma inca* Sowerby, Thesaurus conchyliorum, vol. 1, p. 92, pl. 24, figs. 71–72.
1846. *Cyclostoma inca* Pfeiffer, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 12, pl. 1, figs. 5–7.
1847. *Aperostoma inca* Pfeiffer, Zeitsch. malak., p. 104.
1850. *Cyclotus inca* (pars) Gray, Nomenclature of molluscous animals and shells in the collection of the British Museum, pt. 1, p. 6.
1897. *Neocyclotus* (*Neocyclotus*) *inca* (pars) Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 137.
1923. *Poteria* (*Neocyclotus*) *inca* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 44.

Shell depressed-orbicular, moderately thick, transversely striate, greenish with a dark band below the median hair line. Spire prolonged. Suture profound. Whorls 5. Aperture circular; lip thin, bluish within. Alt. 19 mm.; diameter, 34 mm.

Habitat: Bolivia.

This is a translation of Orbigny's Latin diagnosis in the Magasin de Zoologie. To this we may add from Orbigny's "Voyage . . .," p. 361: The specimen came from Yungas, Bolivia.

In this work Orbigny figures the animal, which is a beautiful rose-colored creature. The shell is rather poorly represented, so we have copied Sowerby's figure.

APEROSTOMA (APEROSTOMA) FILOLIRATUM (Sowerby)

Plate 39, Figures 14–16

1892. *Cyclotus filo-liratus* Sowerby, Proc. Zool. Soc. London, 1892, p. 298, pl. 23, figs. 17–19.
1923. *Poteria* (*Neocyclotus*) *filo-liratus* H. B. Baker, Occ. Pap., Mus. Zool. Univ. Michigan, No. 137, p. 41.

We have not seen specimens of this species so give a translation of Sowerby's description and copy his figure.

Shell broadly umbilicated, somewhat depressed, olivaceous. The suture with a dark olivaceous brown zone marked with numerous hair-like axial ribs. Spire slightly elevated. Suture profound. Whorls 5, convex. The last not descending, concavely depressed near the suture, carinated at the periphery; otherwise convexly rounded. Aperture subcircular; peristome continuous, simple, slightly thickened. Altitude, 12 mm.; greater diameter, 36 mm., lesser, 30 mm.

Habitat: Bogota, Colombia (Museum Da Costa).

"The thread-like ridges on the body-whorl of this shell are much more distant and prominent than in *C. blanchetianum* (Moricand)

and in other allied species. I have at present only seen a single specimen."

Sowerby's figure shows very strong axial ribs on the last whorl, which crenulate the angulated periphery.

Sowerby's figure has 5 whorls and measures: Height, 20 mm.; greater diameter, 36 mm.; lesser diameter, 26.8 mm. Height of aperture, 15.4 mm.; diameter, 15 mm.

Subgenus CYCLOHIDALGOA Bartsch (antea, p. 136)

Aperostomas of helicoid shape with closely crowded axial riblets.

Type: *Aperostoma* (*Cyclohidalgoa*) *translucidum* (Sowerby).

Distribution: Colombia, Venezuela, British Guiana, Trinidad, and Margarita Island.

The radula of *A.* (*C.*) *translucidum trinitense*, according to Guppy, has the formula 3: 3: 3: 3. The verge of *A.* (*C.*) *translucidum bejumense* (H. B. Baker) is on the back of the neck behind the tentacles, and bears a seminal groove and a short terminal appendage.

APEROSTOMA (CYCLOHIDALGOA) BELLI (Beddome)

This species is differentiated from all the other Cyclohidalgoas by its gigantic size. It embraces the two subspecies that follow:

KEY TO THE SUBSPECIES OF APEROSTOMA (CYCLOHIDALGOA) BELLI

Greater diameter more than 50 mm	belli
Greater diameter less than 44 mm	haughti

APEROSTOMA (CYCLOHIDALGOA) BELLI BELLI (Beddome)

PLATE 30, FIGURE 23

1908. *Neocyclotus belli* BEDDOME, Proc. Malac. Soc. London, vol. 8, pp. 20–21 (fig).

We have not seen this subspecies and quote Beddome's description and copy his figure.

"Shell openly but rather narrowly umbilicate, turbinately depressed with conical spire, solid, of a rich chestnut-brown, somewhat paler underneath and at the sutures; whorls five, convex, the first four gradually increasing, the last very large, the two apical ones smooth and shining, the others with prominent close oblique transverse striation; aperture obliquely subcircular; peristome simple, thick, sinuate at the suture; operculum shelly, nearly flat, six-whorled. Diameter 51, height 32 mm.; aperture 25 mm.

"*Hab.*—Colombia, in dense forests near Zaragoza, at 800 feet elevation. Lately discovered by Mr. Ernest Bell."

It is apparently closely related to *A.* (*C.*) *b. haughti*, but the measurements cited by Beddome are much larger than *haughti*.

APEROSTOMA (CYCLOHIDALGOA) BELLI HAUGHTI, new subspecies

PLATE 30, FIGURES 24–26

Shell very large, helicoid, covered with a chestnut-brown periostracum. The nucleus consists of 2 moderately large, well-rounded, smooth turns. The postnuclear whorls are strongly rounded, appressed at the summit, with a depressed zone a little anterior to the summit and marked by somewhat sinuous, retractively curved, closely spaced, slender axial ribs which are about as wide as the spaces that separate them. These riblets become enfeebled on the last portion of the last turn. Suture strongly impressed. Periphery inflated, well rounded. Base narrowly umbilicated, inflated, strongly rounded, and marked by the same type of sculpture as that which characterizes the upper surface. This also extends over the umbilical wall. Aperture large, circular, with a moderately strong auricle at the posterior angle; peristome simple; outer lip thin; inner lip thickened. The parietal wall is covered by a thick callus, which renders the peritreme complete. The operculum is typically aperostomid, showing 6 whorls.

The type, U.S.N.M. No. 524136, was collected by Oscar Haught at the south part of the Department of Santander, Colombia. It has 5.1 whorls and measures: Height, 30.2 mm.; greater diameter, 43 mm.; lesser diameter, 30.3 mm. Height of aperture, 22.8 mm.; diameter, 22.2 mm.

U.S.N.M. No. 472798 contains eight topotypes from the same source.

Its smaller size will differentiate it from *A.* (*C.*) *belli belli* (Beddome).

APEROSTOMA (CYCLOHIDALGOA) TRANSLUCIDUM (Sowerby)

Shell of helicoid shape. Nuclear whorls 2, strongly rounded, smooth. Postnuclear whorls strongly rounded and marked by numerous closely crowded axial riblets. Suture well impressed. Periphery inflated, strongly rounded. Base narrowly umbilicated, inflated, strongly rounded, and marked like the spire. Aperture circular; peristome simple. Operculum typically aperostomid.

KEY TO THE SUBSPECIES OF APEROSTOMA (CYCLOHIDALGOA) TRANSLUCIDUM

- Greater diameter more than 26 mm ---------- major
- Greater diameter less than 23 mm.
  - Spire strongly elevated.
    - Greater diameter more than 18 mm.
      - Axial riblets coarse ---------- bejumense
      - Axial riblets not coarse ---------- trinitense
    - Greater diameter less than 13 mm ---------- pygmaeum
  - Spire not strongly elevated.
    - Greater diameter more than 22 mm ---------- translucidum
    - Greater diameter less than 16 mm ---------- dunoonense

APEROSTOMA (CYCLOHIDALGOA) TRANSLUCIDUM MAJOR (H. B. Baker)

PLATE 30, FIGURES 13–15

1923. *Poteria* (*Neocyclotus*) *translucida major* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, pp. 33, 34, pl. 5, fig. H.

Shell large, helicoid, well elevated, covered by a thin, yellowish horn-colored periostracum. The nucleus consists of 2 small, well-rounded smooth turns. The postnuclear whorls are strongly rounded; the last one appressed at the summit and marked by retractively curved axial riblets, which become irregular on the last half of the last turn. Suture strongly impressed. Periphery inflated, well rounded. Base narrowly umbilicated, inflated, well rounded, and marked by the weak continuation of the axial sculpture, which extends over the umbilical wall. Aperture large, almost circular, with a slight angulation at the posterior angle; peristome simple, the outer lip sharp; inner lip slightly thickened. The parietal wall is covered by a thick callus, which renders the peritreme complete.

The specimen described and figured is one of three, U.S.N.M. No. 360680, collected by H. Pittier near Barquisimeto, Lara, Venezuela. It has 4.8 whorls and measures: Height, 22.9 mm.; greater diameter, 27.2 mm.; lesser diameter, 20.3 mm. Height of aperture, 13 mm.; diameter, 13.7 mm.

The National Museum collections contain additional specimens: No. 362142, two specimens, also collected by Pittier at Puerto La Cruz, Venezuela; No. 307500, two specimens, collected by MacMurray at the Penal Settlement, Essequibo Province, British Guiana; U.S.N.M. No. 428119, one specimen, collected by J. P. Morrison at Kamaria, British Guiana.

The large size will readily distinguish this from the other subspecies of *translucidum*. It is possible that when more material has been received from the various stations included in the wide range that we are here assigning to this subspecies it will be necessary to divide it further, but we have not now enough to make this desirable.

APEROSTOMA (CYCLOHIDALGOA) TRANSLUCIDUM BEJUMENSE (H. B. Baker)

PLATE 30, FIGURES 4–6

1923. *Poteria* (*Neocyclotus*) *translucida bejumensis* H. B. BAKER, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, pp. 33, 34, pl. 5, figs. D, E, F, G.

Shell helicoid, strongly elevated, covered with an olivaceous horn-colored periostracum, which is a little darker on the early turns than on the last; interior of aperture bluish white. The denuded tip is reddish. The nucleus consists of 2 well rounded, smooth turns. The postnuclear whorls are inflated, strongly rounded, and marked by rather strong, retractively curved axial riblets, which are about as wide as the spaces that separate them, and which become intensified toward the last part of the last turn. Suture strongly impressed. Periphery well rounded. Base narrowly umbilicated, inflated, strongly rounded, and marked by the continuation of the wavy axial riblets, which extend also over the umbilical wall. Aperture subcircular, produced at the posterior angle into a rather strong auriculation; peristome simple, outer lip thin; inner thickened. The parietal wall is covered by a rather thick callus, which renders the peritreme complete. Operculum typically aperostomid, showing 5 whorls.

Acad. Nat. Sci. Philadelphia No. 140913 contains two paratypes, one of which we have described and figured. They come from Banco Largo, Bejuma, Venezuela. The specimen described and figured has 4.5 whorls and measures: Height, 15.8 mm.; greater diameter, 18.8 mm.; lesser diameter, 13.9 mm. Height of aperture, 9.1 mm.; diameter, 9.2 mm.

This subspecies is nearest related to *A.* (*C.*) *translucidum trinitense* (Guppy), from which it is easily distinguished by its coarser axial sculpture.

APEROSTOMA (CYCLOHIDALGOA) TRANSLUCIDUM TRINITENSE (Guppy)

Plate 30, Figures 16–18

1864. *Cyclotus trinitensis* Guppy, Ann. Mag. Nat. Hist., ser. 3, vol. 14, p. 245.
1866. *Cyclotus translucidus* Guppy, Ann. Mag. Nat. Hist., ser. 3, vol. 17, pp. 45, 46.
1890. *Neocyclotus translucidus trinitensis* Crosse, Journ. Conchyl., vol. 38, p. 54.
1923. *Poteria* (*Neocyclotus*) *translucida trinitensis* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan No. 137, pp. 31, 33, pl. 5, figs. B, C.

Shell helicoid, rather elevated, the early whorls rose-red, the last one yellowish horn colored; interior of aperture bluish white. The nucleus consists of 2 well-rounded smooth turns. The postnuclear whorls are somewhat inflated, well rounded, and marked on the penultimate whorl by very fine axial riblets; on the last whorl these become a little coarser, and on the last portion of the last turn evanescent and irregular. Below the appressed summit the last whorl is marked by some oblique scratches. Suture strongly impressed. Periphery strongly arched. Base narrowly umbilicated, inflated, strongly rounded, and marked by the continuation of the axial ribs, which extend over the umbilical wall. Aperture circular, protracted into a triangular auricle at the posterior angle. Peristome simple; outer lip thin; inner lip slightly thickened. The parietal wall is covered by a callus, which renders the peritreme complete. The operculum is typically aperostomid and shows 5 whorls.

The specimen described and figured is one of three, Acad. Nat. Sci. Philadelphia No. 104631, collected by S. Brown at Cariaquita, Venezuela, on the east side of the bay; this is across the bay from Trinidad. It has 4.5 whorls and measures: Height, 16.6 mm.; greater diameter, 21.2 mm.; lesser diameter, 15.8 mm. Height of aperture, 10.7 mm.; diameter, 10.8 mm.

We are unable to differentiate this from the large series of Trinidad specimens before us and therefore apply Guppy's name to it. It is nearest related to *A.* (*C.*) *translucidum bejumense* (H. B. Baker) from which the finer sculpture will distinguish it.

APEROSTOMA (CYCLOHIDALGOA) TRANSLUCIDUM PYGMAEUM, new subspecies

Plate 30, Figures 19–21

Shell very small, thin, helicoid, strongly elevated, yellowish horn colored. The nucleus consists of 2 well-rounded smooth turns, forming a rather high apex. The postnuclear whorls are inflated, strongly rounded, and marked by obsolete, retractively curved axial riblets. Suture strongly impressed. Periphery well rounded. Base moderately broadly umbilicated, inflated, strongly rounded, and marked by the continuation of the obsolete sculpture referred to for the spire. Aperture circular, slightly produced into an angle at the posterior angle; peristome simple, the outer and inner lips thin. The parietal wall is covered by a moderately thick callus, which renders the peritreme complete. The operculum is typically aperostomid and shows 5 whorls.

The type, U.S.N.M. No. 24026, was collected by F. E. Sumichrast at Caratal, Venezuela. It has 4.2 whorls and measures: Height, 9.9 mm.; greater diameter, 12.6 mm.; lesser diameter, 9.3 mm. Height of aperture, 5.9 mm.; diameter, 6.1 mm.

U.S.N.M. No. 515727 contains five topotypes from the same source.

The very small size readily distinguishes this form from all the other members of the group.

APEROSTOMA (CYCLOHIDALGOA) TRANSLUCIDUM TRANSLUCIDUM (Sowerby)

Plate 30, Figures 1–3, 10–12

1843. *Cyclostoma translucidum* Sowerby, Proc. Zool. Soc. London, vol. 11, p. 29.

1843. *Cyclostoma translucidum* Sowerby, Thesaurus conchyliorum, vol. 1, p. 106, pl. 23, fig. 4.

1852. *Cyclotus translucidus* Pfeiffer, Monographia pneumonomoporum viventium, vol. 1, p. 20.

1888. *Neocyclotus translucidus* Fischer and Crosse, Mission scientifique au Mexique et dans l'Amérique centrale, vol. 2, pt. 7, p. 162, pl. 48, fig. 1.

1923. *Poteria* (*Neocyclotus*) *translucida translucida* H. B. Baker, Occ. Pap., Mus. Zool. Univ. Michigan, No. 137, pp. 31, 33.

1923. *Poteria* (*Neocyclotus*) *translucida santaguitensis* H. B. Baker, *ibid.*, pp. 33, 35, pl. 5, figs. I. J.

Shell helicoid, moderately elevated and covered with an olive-colored periostracum, which has irregular axial bands of brown. The nucleus consists of 2 well-rounded, smooth turns. The postnuclear whorls are well rounded, the last one falling very slightly below the periphery at the peristome. There is an impressed groove a little below the summit, which gives to the last half of the shell a slightly channeled aspect at this place. The postnuclear whorls are marked by very regular, retractively curved axial riblets, which grow less regular and less strong toward the end of the last turn. In the groove below the periphery there are also oblique scratches. Base moderately broadly openly umbilicated, inflated, strongly rounded and marked by the weak continuation of the axial ribs which extend over the umbilical wall. Aperture circular; peristome thin; the outer lip sharp; the inner slightly thickened. The parietal wall is covered by a moderately thick callus which renders the peritreme complete. Operculum typically aperostomid, showing 6 whorls.

The specimen figured is one of three, U.S.N.M. No. 307424, bearing the label "New Grenada" (Colombia). It has 4.4 whorls and measures: Height, 16.2 mm.; greater diameter, 22.4 mm.; lesser diameter, 16.3 mm. Height of aperture, 10.8 mm.; diameter, 11 mm.

The following additional specimens are in the National collections: No. 307405, two specimens from New Grenada; No. 307408, three specimens from New Grenada.

We have also figured a paratype of Baker's *Poteria* (*Neocyclotus*) *translucida santaguitensis* on plate 30, figures 10–12, which agrees in every way with the typical material. This specimen has 4.3 whorls and measures: Height, 16.8 mm.; greater diameter, 22.2 mm.; lesser diameter, 16.3 mm. Height of aperture, 10.2 mm.; diameter, 11.2 mm.

In the low spire this subspecies resembles most nearly *A.* (*C.*) *t. dunoonense*, from which it can readily be distinguished by its larger size.

APEROSTOMA (CYCLOHIDALGOA) TRANSLUCIDUM DUNOONENSE, new subspecies

Plate 30, Figures 7–9

Shell small, helicoid, moderately elevated, covered by an olivaceous periostracum, through which the early whorls shine pinkish. The nucleus consists of 2 well-rounded, smooth turns. The postnuclear whorls are strongly rounded, the last one appressed at the summit with a well-impressed groove immediately below the summit, which gives to the summit a corded appearance. The postnuclear whorls are marked by weak, retractively curved axial ribs, which become obsolete on the last portion of the last turn. There are a few oblique scratches in the depressed area below the summit.

Suture strongly impressed. Periphery well rounded. Base moderately openly umbilicated and marked by the continuation of the axial sculpture, which here is a little stronger than on the spire. Aperture subcircular, slightly protracted at the posterior angle; peristome simple; outer lip thin; the inner slightly thickened. The parietal wall is covered by a moderately thick callus which renders the peritreme complete.

The type, Acad. Nat. Sci. Philadelphia No. 140876, was collected by Ruthven and Gaige in British Guiana. It has 4.3 whorls and measures: Height, 11.6 mm.; greater diameter, 15.5 mm.; lesser diameter, 11.2 mm. Height of aperture, 7.4 mm.; diameter, 7.8 mm.

In shape and in sculpture this subspecies most nearly resembles the typical form, from which it can be differentiated readily by its much smaller size.

LIRACYCLOTUS, new genus

Small aperostomine shells of helicoid shape, having the whorls marked with low spiral threads. The operculum bears a low, reflected, calcareous spiral lamella, between whose turns the upturned outer edge of the basal chondroid plate is apparent.

Type: *Liracyclotus psilomitus* (Pfeiffer).

Distribution: Venezuela.

LIRACYCLOTUS PSILOMITUS (Pfeiffer)

Plate 19, Figures 7–9

1851. *Cyclostoma psilomitum* Pfeiffer, Proc. Zool. Soc. London, vol. 19, p. 250.
1852. *Cyclophorus psilomitus* Pfeiffer, Monographia pneumonopomorum viventium, vol. 1, p. 96.
1854. *Cyclostoma psilomitum* Pfeiffer, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, p. 319, pl. 41, figs. 24–25.
1897. *Amphicyclotus psilomitus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 139.

Shell small, helicoid, covered with a horn-colored periostracum. The nucleus consists of 2 well-rounded, smooth turns. The postnuclear whorls are strongly rounded and marked by slender spiral threads of which 10 are present between the summit and periphery. In addition, the whorls are marked by weak incremental lines and numerous, heavy, impressed axial resting stages, which render the surface rather rough. The spiral threads are much narrower than the spaces that separate them; they are not quite regularly spaced, and there is a little broader zone with a spiral liration immediately below the summit. Suture strongly impressed. Periphery well rounded. Base moderately broadly umbilicated with rather strong, low, rounded spiral threads, which are separated by mere impressed lines. Of these, 14 are present between the periphery and the umbilical angulation and 6 more on the outer portion of the umbilical wall. They seem to be absent in the interior. The base also has a continuation of the incremental lines. Aperture circular; peristome simple, sharp all around. The parietal wall is covered by a moderately thick callus which renders the peritreme complete. The operculum bears a low reflected calcareous spiral lamella between whose turns the upturned outer edge of the basal chondroid plate is apparent.

U.S.N.M. No. 307404 contains the figured specimen, which was collected by Cuming in Venezuela. It has 4.6 whorls and measures: Height, 8.3 mm.; greater diameter, 13.2 mm.; lesser diameter, 9.8 mm. Height of aperture, 8 mm., diameter, 6.4. mm.

INCERTICYCLUS, a pseudogeneric term

A full discussion of this proposed term will be found on p. 137.

INCERTICYCLUS DISTINCTUS (Sowerby)

Plate 39, Figure 11

1843. *Cyclostoma distinctum* Sowerby, Thesaurus conchyliorum, vol. 1, p. 106, pl. 24, fig. 38.
1897. *Neocyclotus* (*Neocyclotus*) *distinctus* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 137.

We have not seen this species, and quote Sowerby's description and copy his figure.

"Shell orbicular, depressed, nearly flat, thin, white, with a depressed spire, consisting of four volutions, not quite contiguous to each other, rounded and spirally grooved; aperture circular, with a very thin sharp-edged peritreme.

"Bay of Montija, West Colombia; H. Cuming," collector.

INCERTICYCLUS CONNIVENS (H. Adams)

Plate 39, Figure 10

1866. *Aperostoma connivens* H. Adams, Proc. Zool. Soc. London, 1866, p. 443, pl. 38, fig. 6.
1876. *Cyclotus connivens* Pfeiffer, Monographia pneumonopomorum viventium, vol. 4, p. 35.
1897. *Neocyclotus* (*Neocyclotus*) *connivens* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 137.
1912. *Neocyclotus connivens* Kobelt, Martini-Chemnitz Conchylien Cabinet, vol. 1, sect. 19, pt. 3, p. 906, pl. 140, fig. 10.
1923. *Aperostoma connivens* H. B. Baker, Occ. Pap. Mus. Zool. Univ. Michigan, No. 137, p. 29 (according to Baker not an *Aperostoma*).

We have seen no specimens referable to this species and therefore give a translation of Adams' description and copy his figure:

Shell broadly umbilicated, depressed, thin, striate and unequally lirate, white, covered with a yellowish brown periostracum. Spire slightly elevated; apex somewhat prominent, smooth, reddish horn colored; suture channeled. Whorls 4.5, convex, the last not solute; aperture almost circular, oblique; peristome continuous, straight, subangulated above and shortly adnate.

Diameter: Greater, 10 mm.; lesser, 8.5 mm. Height, 7 mm. Diameter of aperture, 4.5 mm.

Type locality: Peru.

To this Adams adds: "This species is closely allied to *A. perdistinctum*, Gundl.; but the suture is less deeply canaliculated, the last whorl is not separated in front as in that species, and the raised spiral lines on the whorls are reduced to one on the inner side within the umbilicus."

INCERTICYCLUS CAYENNENSIS (Shuttleworth)

1852. *Cyclostoma* (*Cyclophorus*) *cayennense* SHUTTLEWORTH, Berner Mitth., 1852, p. 299 (Diagn. n. Moll., No. 3, p. 39).

1854. *Cyclophorus cayennensis* PFEIFFER, Malak. Blätter, vol. 1, p. 86.

1897. *Amphicyclotus cayennensis* KOBELT and MÖLLENDORFF, Nachrb. deutschen malak. Ges., vol. 29, p. 139.

We have not seen specimens referable to this species and so give a translation of Shuttleworth's description:

Shell broadly umbilicated, conoid orbicular, solid, marked by oblique, undulating and anastomosing riblets, olivaceous horn colored. Spire shortly conoid, somewhat obtuse; whorls 4, convex, increasing gradually; the last roundly subinflated; aperture nearly vertical, subcircular; spire subangulated; peristome simple, acute, continuous, the upper margin produced and inbent, deeply incised at its insertion. Columella somewhat thickened. Operculum thin, corneous, closely whorled, concave externally. Greater diameter, 21 mm.; lesser, 15 mm.; height, 15 mm. Aperture height, 10.5 mm.; diameter, 9.5 mm.

Habitat: Cayenne (Verreaux).

Observations: To this Shuttleworth adds that he has seen three specimens resembling in sculpture *C. ponderosum* Pfeiffer, *texturatum* Sowerby, and *stramineum* Reeve, but the incision of the dextral margins of the peristome renders it very distinct. In that respect it allies with *C. incomptum* Sowebry, judging from the figure and description.

We are greatly puzzled about the status of this species. The corneous operculum would put it in the Amphicyclotinae, while the description of the shell suggests aperostomine affinity. We are therefore placing it in this group of unknown relationship.

INCERTICYCLUS DUFFIANUS (C. B. Adams)

1845. *Cyclostoma duffianum* C. B. ADAMS, Proc. Boston Soc. Nat. Hist., vol. 2, p. 11.

1847. *Aperostoma duffianum* PFEIFFER, Zeitschr. Mal. vol. 4, p. 104.

1852. *Cyclotus duffianus* Pfeiffer, Monographia pneumonopomorum viventium, vol. 1, p. 29.

1857. *Cyclotus* (*Cyclotus*) *duffianus* Chitty, Proc. Zool. Soc. London, 1857, p. 142.

1898. *Neocyclotus* (*Plectocyclotus*) *duffianus* Kobelt and Mölledorff, Nachrb. deutschen malak. Ges., vol. 29, p. 138, reprint.

A translation of Adams's Latin diagnosis follows:

Shell large, discoid, reddish white; whorls 4.5, cylindrical; umbilicus broad, profound; margin (aperture) simple. Divergence, 150°, greater diameter, 47.5 mm.; lesser diameter, 35.2 mm.; height, 22 mm. This species is dedicated to Officer William Duff, well versed in Jamaican conchology.

Of this species Chitty says (*loc. cit.*) that *C. duffianus* C. B. Adams "is not a Jamaican, but a South American species—*fide* Adams and Mr. Bland, who found duplicates in South America."

No huge shell like this is known from Jamaica, and there seems little doubt but what Chitty's statement is correct. It is possible that if the type were known or available this might prove to be an *Aperostoma*, from Panama, related to *Aperostoma* (*Aperostoma*) *giganteum* (Reeve).

INCERTICYCLUS BRAZILIENSIS (Gray)

Plate 39, Figure 13

1839. *Cyclostoma brasiliense* Gray, The zoology of Captain Beechey's voyage, p. 147, pl. 38, fig. 32.

We have not seen specimens of this species and so copy Gray's description and figure:

"Shell of a rather depressed orbicular form, thin, white, opaque; whorls four or five, transversely striated, striae sharp and close-set; suture deep; aperture circular, peritreme thin, sharp edged; umbilicus large; operculum shelly, thick, double, smooth within and with a very fine spiral line outside.

"Found in abundance in shady places near Rio Janeiro."

The figure shows a keel limiting the edge of the umbilicus. We know nothing from the mainland with such a structure.

INCERTICYCLUS PROMINULUS (Orbigny)

Plate 39, Figures 7–9

1837. *Cyclostoma prominula* Orbigny, Voyage dans l'Amérique Méridionale . . ., vol. 5, pt. 3, p. 362.

Shell very depressed-helicoid, soiled white. The nucleus consists of about 1¼ inflated, strongly rounded, smooth turns, which form a conspicuous prominent apex. The postnuclear whorls are strongly rounded with the summit falling a little below the periphery of the preceding turn. The last whorl may be solute for about one-tenth of a turn or adnate to the preceding whorl. The postnuclear whorls are marked by strong, retractively curved axial riblets, which become decidely irregular and coarse on the last whorl. Suture very deeply impressed. Periphery rounded. Base openly broadly umbilicated, inflated, strongly rounded and marked by the continuation of the axial ribs which cross the umbilical wall. Aperture circular, slightly protracted at the posterior angle; peristome simple, thin, even on the inner lip, solute or attached to the preceding turn. Operculum?

The specimen figured is one of two, Acad. Nat. Sci. Philadelphia No. 12975, collected near Campos, Brazil, by Anthony. It has 4.5 whorls and measures: Height, 8 mm.; diameter, 13 mm.

It seems possible that when adequate material has been examined this species may prove to be a *Cyclopomops*.

INCERTICYCLUS GAYI (Hupé)

1854. *Cyclostoma gayi* Hupé, *in* Gay, Historia fisica y politica de Chile, Zool., vol. 8, p. 117.

1858. *Cyclophorus gayi* Pfeiffer, Monographia pneumonopomorum viventium, vol. 2, p. 65.

1897. *Amphicyclotus gayi* Kobelt and Möllendorff, Nachrb. deutschen malak. Ges., vol. 29, p. 139.

We have not seen this species and so give a translation of Hupé's description:

Shell small, subdiscoid, solid, ferrugineous yellow. Whorls 3, convex, carinated externally above. Suture profound. Aperture large, rounded with the margins entire and sharp. Umbilicus open. Operculum corneous.

To this Hupé adds: A small shell, a little discoid with 3 rounded convex whorls, marked on the upper side by obtuse poorly developed threads.

The above Latin diagnosis is followed by an explanation in Spanish:

Shell small, somewhat discoid, thick with 3 rounded, convex whorls. Upper surface marked by poorly developed spiral threads, the median one of which is stronger than the rest. Spire obtuse, whorls separated by a profound suture; aperture large, circular; peristome thin and sharp, thickening within the aperture. Umbilicus small and rounded. Entire surface ferrugineous brown; aperture whitish within. Operculum thin, corneous. Diameter, ¾ of a line [1.5 mm.]; height, ½ line [1 mm.].

This species is one of the smallest of the genus yet known. It is characterized by its subdiscoid form and spiral lirations, the median spiral thread being stronger than the rest. Its ferrugineous color also helps to distinguish it from the other members of the genus.

Habitat: Under rocks a short distance from the sea in the northern part of Chile.

A LIST OF THE MAINLAND CYCLOPHORIDS

ARGENTINA:

Adelopoma tucma, p. 148.

BOLIVIA:

Calaperostoma orbignyi, p. 168.
Aperostoma (*Aperostoma*) *boliviense*, p. 260.
Aperostoma (*Aperostoma*) *inca*, p. 267.

BRAZIL:

Aperostoma (*Incidostoma*) *hedui*, p. 191.
Aperostoma (*Cyclopomops*) *moricandi*, p. 219.
Aperostoma (*Aperostoma*) *fultoni*, p. 242.
Aperostoma (*Aperostoma*) *amazonense*, p. 243.
Aperostoma (*Aperostoma*) *blanchetianum*, p. 244.
Aperostoma (*Aperostoma*) *agassizi*, p. 254.
Aperostoma (*Aperostoma*) *redfieldi*, p. 261.
Aperostoma (*Aperostoma*) *currani*, p. 261.
Apersotoma (*Aperostoma*) *merrilli*, p. 263.
Aperostoma (*Aperostoma*) *pulchellum*, p. 263.
Incerticyclus prominulus, p. 277.
Incerticyclus braziliensis, p. 277.

BRITISH GUIANA:

Aperostoma (*Cyclohidalgoa*) *translucidum major*, p. 270.
Aperostoma (*Cyclohidalgoa*) *translucidum dunoonense*, p. 273.

BRITISH HONDURAS:

Aperostoma (*Neocyclotus*) *dysoni cookei*, p. 215.

CHILE:

Incerticyclus gayi, p. 278.

COLOMBIA:

Buckleyia bifasciata, p. 153.
Calaperostoma leai, p. 165.
Calaperostoma hidalgoi, p. 167.
Calaperostoma cumingi, p. 167.
Calacyclotus olssoni, p. 178.
Calacyclotus atratensis, p. 179.
Aperostoma (*Incidostoma*) *pergrandis*, p. 188.
Aperostoma (*Incidostoma*) *kobelti*, p. 190.
Aperostoma (*Incidostoma*) *nirafe*, p. 193.
Aperostoma (*Austrocyclotus*) *limellum*, p. 197.
Aperostoma (*Austrocyclotus*) *peilei*, p. 200.
Aperostoma (*Neocyclotus*) *wetmorei*, p. 203.
Aperostoma (*Neocyclotus*) *smithi*, p. 216.
Aperostoma (*Neocyclotus*) *corpulentum*, p. 217.
Aperostoma (*Neocyclotus*) *sanctaemarthae*, p. 218.
Aperostoma (*Cyclohidalgoa*) *belli belli*, p. 268.
Aperostoma (*Cyclohidalgoa*) *belli haughti*, p. 269.
Aperostoma (*Cyclohidalgoa*) *translucidum translucidum*, p. 269.
Aperostoma (*Aperostoma*) *umbilicatum*, p. 224.
Aperostoma (*Aperostoma*) *cumingi*, p. 224.
Aperostoma (*Aperostoma*) *paezense*, p. 225.
Aperostoma (*Aperostoma*) *bogotense*, p. 226.

COLUMBIA—Continued.

Aperostoma (Aperostoma) simile, p. 227.
Aperostoma (Aperostoma) cingulatum, p. 228.
Aperostoma (Aperostoma) dunkeri, p. 230.
Aperostoma (Aperostoma) pailaense, p. 231.
Aperostoma (Aperostoma) paezicolum, p. 232.
Aperostoma (Aperostoma) confusum, p. 237.
Aperostoma (Aperostoma) utriaense, p. 240.
Aperostoma (Aperostoma) laxatum, p. 244.
Aperostoma (Aperostoma) caucaense, p. 258.
Aperostoma (Aperostoma) colombiense, p. 258.
Aperostoma (Aperostoma) popayanum, p. 264.
Aperostoma (Aperostoma) filoliratum, p. 267.

COSTA RICA:

Adelopoma costaricense, p. 150.
Barbacyclus princeps, p. 175.
Barbacyclus underwoodi, p. 176.
Barbacyclus boucardi, p. 177.
Aperostoma (Neocyclotus) dysoni valerioi, p. 213.
Aperostoma (Aperostoma) carmioli, p. 233.
Aperostoma (Aperostoma) costaricense, p. 234.
Aperostoma (Aperostoma) exiguum, p. 234.
Aperostoma (Aperostoma) bisinuatum, p. 235.
Aperostoma (Aperostoma) irregulare, p. 236.
Aperostoma (Aperostoma) pittieri, p. 236.

ECUADOR:

Buckleyia bicincta, p. 152.
Buckleyia martinezi, p. 152.
Lagocyclus antoni, p. 154.
Lagocyclus haematomma, p. 155.
Lagocyclus crosseanus, p. 156.
Lagocyclus vasconesi, p. 156.
Calaperostoma esmeraldense, p. 160.
Calaperostoma rosenbergi, p. 160.
Calaperostoma guayaquilense, p. 161.
Calaperostoma purum, p. 162.
Calaperostoma bourcieri, p. 163.
Calaperostoma nigrofasciatum, p. 164.
Calaperostoma cousini, p. 166.
Aperostoma (Incidostoma) pichinchense, p. 191.
Aperostoma (Incidostoma) hitomi, p. 194.
Aperostoma (Incidostoma) stirlingi, p. 195.
Aperostoma (Austrocyclotus) granulatum, p. 196.
Aperostoma (Aperostoma) manabense, p. 239.
Aperostoma (Aperostoma) fischeri, p. 239.
Aperostoma (Aperostoma) ecuadorense, p. 248.
Aperostoma (Aperostoma) subcingulatum, p. 249.
Aperostoma (Aperostoma) quitense, p. 250.
Aperostoma (Aperostoma) olivaceum, p. 251.
Aperostoma (Aperostoma) salengoense, p. 253.
Aperostoma (Aperostoma) masvense, p. 254.
Aperostoma (Aperostoma) pazi, p. 257.
Aperostoma (Aperostoma) perezi, p. 259.

FRENCH GUIANA:
- *Incerticyclus cayennensis*, p. 276.

GUATEMALA:
- *Tomocyclus gealei*, p. 143.
- *Tomocyclus guatemalensis*, p. 144.
- *Tomocyclus siphonis*, p. 145.
- *Tomocyclus constrictus*, p. 145.
- *Tomocyclus simulacrum*, p. 146.
- *Tomocyclus copanensis*, p. 147.
- *Adelopoma stolli*, p. 149.
- *Megacyclotus ponderosus*, p. 182.
- *Amphicyclotus texturatus*, p. 186.
- *Aperostoma* (*Neocyclotus*) *dysoni hinkleyi*, p. 206.
- *Aperostoma* (*Neocyclotus*) *dysoni cookei*, p. 215.

HONDURAS:
- *Amphicyclotus goldfussi*, p. 184.
- *Aperostoma* (*Neocyclotus*) *dysoni dysoni*, p. 204.
- *Aperostoma* (*Neocyclotus*) *dysoni dyeri*, p. 205.
- *Aperostoma* (*Neocyclotus*) *dysoni ruatanense*, p. 207.

MEXICO:
- *Adelopoma stolli*, p. 149.
- *Cyrtotoma avus*, p. 169.
- *Cyrtotoma salleanum*, p. 170.
- *Cyrtotoma ignotum*, p. 170.
- *Cyrtotoma fischeri*, p. 170.
- *Cyrtotoma palmeri*, p. 172.
- *Cyrtotoma mexicanum*, p. 173.
- *Cyrtotoma goldmani*, p. 174.
- *Cyrtotoma walkeri*, p. 174.
- *Mexcyclotus cooperi*, p. 180.
- *Mexcyclotus lutescens*, p. 181.
- *Megacyclotus palenquensis*, p. 183.
- *Amphicyclotus boucardi*, p. 184.
- *Amphicyclotus maleri*, p. 185.
- *Amphicyclotus texturatus*, p. 186.
- *Aperostoma* (*Neocyclotus*) *dysoni aureum*, p. 209.
- *Aperostoma* (*Neocyclotus*) *dysoni ambiguum*, p. 211.
- *Aperostoma* (*Neocyclotus*) *dysoni berendti*, p. 212.
- *Aperostoma* (*Neocyclotus*) *dysoni sallei*, p. 213.

NICARAGUA:
- *Aperostoma* (*Neocyclotus*) *dysoni sumichrasti*, p. 209.
- *Aperostoma* (*Neocyclotus*) *dysoni nicaraguense*, p. 214.
- *Aperostoma* (*Neocyclotus*) *chrysacme*, p. 219.

PANAMA:
- *Calaperostoma pittieri*, p. 164.
- *Calacyclotus olssoni*, p. 178.
- *Aperostoma* (*Austrocyclotus*) *panamense*, p. 197.
- *Aperostoma* (*Neocyclotus*) *dysoni affine*, p. 210.
- *Aperostoma* (*Aperostoma*) *confusum*, p. 237.
- *Aperostoma* (*Aperostoma*) *giganteum*, p. 237.
- *Aperostoma* (*Aperostoma*) *brujense*, p. 241.
- *Aperostoma* (*Aperostoma*) *portobellense*, p. 242.

PERU:

Lagocyclus bartletti, p. 157.
Calaperostoma chanchapoyasense, p. 162.
Aperostoma (*Incidostoma*) *pizarroi*, p. 193.
Aperostoma (*Aperostoma*) *veracochanum*, p. 229.
Aperostoma (*Aperostoma*) *allantayum*, p. 230.
Aperostoma (*Aperostoma*) *peruense*, p. 245.
Aperostoma (*Aperostoma*) *leai*, p. 246.
Aperostoma (*Aperostoma*) *depressum*, p. 247.
Aperostoma (*Aperostoma*) *peruvianum*, p. 252.
Aperostoma (*Aperostoma*) *balsasense*, p. 265.
Incerticyclus connivens, p. 275.

VENEZUELA:

Adelopoma occidentale, p. 52.
Adelopoma bakeri, p. 149.
Aperostoma (*Austrocyclotus*) *stramineum*, p. 198.
Aperostoma (*Austrocyclotus*) *aulari*, p. 199.
Aperostoma (*Austrocyclotus*) *glaucostomum*, p. 199.
Aperostoma (*Austrocyclotus*) *kugleri*, p. 201.
Aperostoma (*Austrocyclotus*) *carabobense*, p. 201.
Aperostoma (*Austrocyclotus*) *burringtoni*, p. 202.
Aperostoma (*Aperostoma*) *venezuelense*, p. 247.
Aperostoma (*Aperostoma*) *castaneum*, p. 252.
Aperostoma (*Aperostoma*) *nevadense*, p. 255.
Aperostoma (*Aperostoma*) *fasciatum*, p. 256.
Aperostoma (*Aperostoma*) *nanum*, p. 262.
Aperostoma (*Aperostoma*) *cardozi*, p. 266.
Aperostoma (*Cyclohidalgoa*) *translucidum bejumense*, p. 270.
Aperostoma (*Cyclohidalgoa*) *translucidum trinitense*, pp. 136, 271.
Aperostoma (*Cyclohidalgoa*) *translucidum pygmaeum*, p. 272.
Liracyclotus psilomitus, p. 274.

NORTHERN SOUTH AMERICA:

Filocyclus delphinulus, p. 158.

LOCALITY:

Aperostoma (*Incidostoma*) *malleatum*, p. 188.
Aperostoma (*Incidostoma*) *incomptum*, p. 192.
Aperostoma (*Aperostoma*) *inconspicuum*, p. 227.
Incerticyclus duffianus, p. 276.

EXPLANATION OF PLATES

(All figures are natural size except those on plate 8, which are enlarged four times, and those on plate 40, which are enlarged ten times. The opercula on plate 42 have a magnification of three diameters.)

PLATE 1

1–3. *Farcimen* (*Farcimen*) *pseudotortum turquinoense.*
4–6. *Farcimen* (*Farcimen*) *pseudotortum bayamense.*
7–9. *Farcimen* (*Farcimen*) *pseudotortum pseudotortum.*
10–12. *Farcimen* (*Farcimen*) *ungula perconvexum.*
13–15. *Farcimen* (*Farcimen*) *ungula holguinense.*
16–18. *Farcimen* (*Farcimen*) *ungula mayense.*
19–21. *Farcimen* (*Farcimen*) *ungula mayariense.*
22–24. *Farcimen* (*Farcimen*) *ungula guantanamense.*
25–27. *Farcimen* (*Farcimen*) *ungula semivestitum.*
28–30. *Farcimen* (*Farcimen*) *ungula ungula.*

PLATE 2

1–3. *Farcimen* (*Farcimen*) *wrighti biayaense.*
4–6. *Farcimen* (*Farcimen*) *wrighti najazaense.*
7–9. *Farcimen* (*Farcimen*) *camagueyanum florencianum.*
10–12. *Farcimen* (*Farcimen*) *wrighti martianum.*
13–15. *Farcimen* (*Farcimen*) *ungula elephantinum.*
16–18. *Farcimen* (*Farcimen*) *ungula mirandum.*
19–21. *Farcimen* (*Farcimen*) *yunquense.*
22–24. *Farcimen* (*Farcimen*) *wrighti wrighti.*
25–27. *Farcimen* (*Farcimen*) *camagueyanum camagueyanum.*
28–30. *Farcimen* (*Farcimen*) *camagueyanum mayajiguense.*

PLATE 3

1–3. *Farcimen* (*Farcimen*) *bituberculatum giganteum.*
4–6. *Farcimen* (*Farcimen*) *bituberculatum gutierrezi.*
7–9. *Farcimen* (*Farcimen*) *obesum obesum.*
10–12. *Farcimen* (*Farcimen*) *bituberculatum bituberculatum.*
13–15. *Farcimen* (*Farcimen*) *bituberculatum crassum.*
16–18. *Farcimen* (*Farcimen*) *bituberculatum minor.*
19–21. *Farcimen* (*Farcimen*) *obesum subobesum.*

PLATE 4

1–3. *Farcimen* (*Farcimen*) *seminudum guitarti.*
4–6. *Farcimen* (*Farcimen*) *alutaceum digitale.*
7–9. *Farcimen* (*Farcimen*) *seminudum collare.*
10–12. *Farcimen* (*Farcimen*) *alutaceum alutaceum.*
13–15. *Farcimen* (*Farcimen*) *alutaceum magnificum.*
16–18. *Farcimen* (*Farcimen*) *seminudum leoni.*
19–21. *Farcimen* (*Farcimen*) *seminudum magister.*
22–24. *Farcimen* (*Farcimen*) *seminudum seminudum.*
25–27. *Farcimen* (*Farcimen*) *seminudum poeyi.*

PLATE 5

1–3. *Farcimen (Farcimen) auriculatum auriculatum.*
4–6. *Farcimen (Farcimen) leoninum leonellum.*
7–9. *Farcimen (Farcimen) auriculatum clenchi.*
10–12. *Farcimen (Farcimen) tortum.*
13–15. *Farcimen (Farcimen) rocai.*
16–18. *Farcimen (Farcimen) auriculatum senectum.*
19–21. *Farcimen (Farcimen) auriculatum bicolor.*
22–24. *Farcimen (Farcimen) tortum.*
25–27. *Farcimen (Farcimen) leoninum leoninum.*

PLATE 6

1–3. *Farcimen (Farcimen) gundlachi gundlachiellum.*
4–6. *Farcimen (Farcimen) torrei.*
7–9. *Farcimen (Farcimen) subventricosum subventricosum.*
10–12. *Farcimen (Farcimen) subventricosum balneorum.*
13–15. *Farcimen (Farcimen) ventricosum.*
16–18. *Farcimen (Farcimen) mani.*
19–21. *Farcimen (Farcimen) subventricosum multistriatinum.*
22–24. *Farcimen (Farcimen) gundlachi gundlachi.*
25–27. *Farcimen (Farcimen) gundlachi anafense.*

PLATE 7

1–3. *Farcimen (Farcimen) guanense guanense.*
4–6. *Farcimen (Farcimen) vinalense vinalense.*
7–9. *Farcimen (Farcimen) vinalense scopulorum.*
10–12. *Farcimen (Farcimen) superbum itinerarium.*
13–15. *Farcimen (Farcimen) hendersoni hendersoni.*
16–18. *Farcimen (Farcimen) arangoi.*
19–21. *Farcimen (Farcimen) guanense lagunillense.*
22–24. *Farcimen (Farcimen) hendersoni catalinense.*
25–27. *Farcimen (Farcimen) procer.*
28–30. *Farcimen (Farcimen) superbum superbum.*

PLATE 8

1– 3. *Crocidopoma (Cyclocubana) gundlachi gundlachi.*
4– 6. *Crocidopoma (Cyclocubana) gundlachi wrighti.*
7– 9. *Crocidopoma (Cyclocubana) gundlachi ignotum.*
10–12. *Crocidopoma (Cyclocubana) perdistinctum toroense.*
13–15. *Crocidopoma (Cyclocubana) perdistinctum perdistinctum.*

PLATE 9

1– 3. *Farcimoides domingoense.*
4– 6. *Farcimoides orbignyi.*
7– 9. *Megalomastoma (Megalomastoma) brunneum.*
10–12. *Megalomastoma (Megalomastoma) antillarum.*
13–15. *Megalomastoma (Megalomastomoides) verruculosum.*
16–18. *Megalomastoma (Megalomastoma) petiti.*
19. *Megalomastoma (Megalomastomoides) verruculosum.*
20. *Megalomastoma (Megalomastoma) petiti.*
21. *Megalomastoma (Megalomastoma) antillarum.*

22. *Megalomastoma (Megalomastoma) brunneum.*
23–25. *Farcimen (Neopupina) croceum.*
26–28. *Farcimen (Neopupina) hjalmersoni.*
29–31. *Farcimoides sallei.*
32–34. *Farcimen (Neopupina) curtum,* type
35–37. *Farcimen (Neopupina) curtum*

PLATE 10

1– 3. *Amphicyclotulus (Amphicyclotulus) acutiliratus.*
4– 5. *Amphicyclotulus (Amphicyclotulus) rufescens.*
6– 8. *Amphicyclotulus (Amphicyclotulus) schrammi.*
9–11. *Amphicyclotulus (Amphicyclotulus) dominicensis.*
12–14. *Cyclohaitia haitia.*
15–17. *Amphicyclotulus (Amphicyclotulus) mineri.*
18–20. *Amphicyclotulus (Amphicyclotulus) guadeloupensis.*

PLATE 11

1– 3. *Amphicyclotulus (Amphicyclotulus) amethystinus.*
4– 6. *Amphicyclotulus (Amphicyclotulus) liratus.*
7– 9. *Amphicyclotulus (Amphicyclotulus) perplexus.*
10–12. *Amphicyclotulus (Amphicyclotulus) beauianus.*
13–15. *Crocidopoma (Crocidopoma) vortex vortex.*
16–18. *Crocidopoma (Crocidopoma) vortex elevatum.*
19–21. *Amphicyclotulus (Amphicyclotulus) portoricensis.*

PLATE 12

1– 3. *Crocidopoma (Crocidopoma) milleri.*
4– 6. *Cyclovendreysia dubiosa.*
7– 9. *Cyclojamaicia bondi.*
10–12. *Cyclojamaicia suturalis.*
13–15. *Crocidopoma (Crocidopoma) abbotti.*
16. *Crocidopoma (Crocidopoma) floccosum.*
18–20. *Cyclopilsbrya (Cyclopilsbrya) glenburniensis.*
21–23. *Cyclopilsbrya (Cyclopilsbrya) hendersoni.*
24–26. *Cyclopilsbrya (Cyclopilsbrya) rupisfontis.*
27–29. *Cyclopilsbrya (Cyclopilsbrya) striosa.*
30–32. *Cyclopilsbrya (Cyclopilsbrya) westmorelandensis.*
33–35. *Cyclopilsbrya (Cyclopilsbrya) jugosa.*
36–38. *Crocidopoma (Crocidopoma) orcutti.*

PLATE 13

1– 3. *Cyclopilsbrya (Cyclopilsbrya) rufilabris.*
4– 6. *Cyclopilsbrya (Cyclopilsbrya) asperula.*
7– 9. *Cyclopilsbrya (Cyclocaymania) caymanensis.*
10–12. *Cyclopilsbrya (Cyclocaymania) caymanensis,* type.
13–15. *Cyclopilsbrya (Cyclocaymania) fonticula.*
16–18. *Cyclopilsbrya (Cyclocaymania) fonticula.*
19–21. *Ptychocochlis manchesterensis.*
22–24. *Cyclopilsbrya (Cyclocaymania) laevitesta.*
25–27. *Ptychocochlis gemma.*
28–30. *Ptychocochlis welchi.*

31–33. *Ptychocochlis taylori.*
34–36. *Ptychocochlis gossei.*
37–39. *Ptychocochlis corrugatior.*
40–42. *Ptychocochlis varians.*
43–45. *Cyclopilsbrya* (*Cyclopilsbrya*) *caribaea.*

Plate 14

1– 3. *Ptychocochlis martensi.*
4– 6. *Ptychocochlis adamsi.*
7– 9. *Ptychocochlis corrugata.*
10–12. *Ptychocochlis shawae.*
13–15. *Ptychocochlis zigzag.*
16–18. *Ptychocochlis simpsoni.*
19–21. *Ptychocochlis clappi.*
22–24. *Ptychocochlis senex.*

Plate 15

1– 3. *Ptychocochlis marianna.*
4– 6. *Ptychocochlis lacteofluvialis.*
7– 9. *Ptychocochlis hendersoni.*
10–12. *Ptychocochlis minor.*
13–15. *Ptychocochlis savannensis.*
16–18. *Ptychocochlis subglobosa.*
19–21. *Ptychocochlis campeachyi campeachyi.*
22–24. *Ptychocochlis campeachyi petricola.*
25–26. *Ptychocochlis subrugosa.*
27–29. *Ptychocochlis orcutti.*
30–32. *Ptychocochlis magna.*
33–35. *Ptychocochlis montegoensis.*
36–38. *Ptychocochlis vendryesi.*

Plate 16

1– 3. *Poteria* (*Cyclobakeria*) *welchi welchi.*
4– 6. *Poteria* (*Poteria*) *jamaicensis.*
7– 9. *Poteria* (*Poteria*) *lineata cycloata.*
10–12. *Poteria* (*Poteria*) *imitator.*
13–15. *Poteria* (*Cyclobakeria*) *novaspei.*
16–18. *Poteria* (*Poteria*) *crassa.*
19–21. *Poteria* (*Cyclobakeria*) *nana.*
22–24. *Poteria* (*Cyclobakeria*) *tryoniana.*
25–27. *Poteria* (*Poteria*) *plana.*
28–30. *Poteria* (*Poteria*) *pallescens.*
31–33. *Poteria* (*Poteria*) *burringtoni.*
34–36. *Poteria* (*Poteria*) *lineata lineata.*
37–39. *Poteria* (*Poteria*) *corrugatissima.*

Plate 17

1– 3. *Aperostoma* (*Austrocyclotus*) *vincentinum.*
4– 6. *Poteria* (*Cyclobakeria*) *chittyi.*
7– 9. *Poteria* (*Cyclobakeria*) *balnearis.*
10–12. *Aperostoma* (*Austrocyclotus*) *rugatum.*
13–15. *Poteria* (*Cyclobakeria*) *notatior.*

16–18. *Poteria* (*Cyclobakeria*) *yallahsensis*.
19–21. *Aperostoma* (*Austrocyclotus*) *grenadense grenadense*.
22–24. *Aperostoma* (*Austrocyclotus*) *grenadense mesweeni*.
25–27. *Aperostoma* (*Cycladamsia*) *ruber pretiosum*.
28–30. *Aperostoma* (*Cycladamsia*) *bairdianum*.
31–33. *Aperostoma* (*Cycladamsia*) *ruber ruber*.
34–36. *Poteria* (*Cyclobakeria*) *dentistigmata*.
37–39. *Poteria* (*Cyclobakeria*) *welchi taylori*.
40–42. *Poteria* (*Cyclobakeria*) *magister*.

Plate 18

1– 3. *Incerticyclus bakeri*.
4– 6. *Incerticyclus perpallidus*.
7– 9. *Aperostoma* (*Cyclohidalgoa*) *translucidum trinitense* (Margarita Island).
10–12. *Aperostoma* (*Cyclohidalgoa*) *translucidum trinitense* (Trinidad).
13–18. *Aperostoma* (*Cycladamsia*) *rudisplanusque*.
19–21. *Incerticyclus perplexus*.
22–24. *Aperostoma* (*Cycladamsia*) *fossile*.
25. *Incerticyclus cinereus*.
26–28. *Aperstoma* (*Cycladamsia*) *seminudum scabratum*.
29–31. *Aperstoma* (*Cycladamsia*) *seminudum humile*.
32–34. *Aperstoma* (*Cycladamsia*) *seminudum seminudum*.
35–37. *Aperstoma* (*Cycladamsia*) *seminudum deburghaeanum*.

Plate 19

1. *Tomocyclus gealei*.
2. *Tomocyclus constrictus*.
3. *Tomocyclus copanensis*.
4. *Tomocyclus guatemalensis*.
5. *Tomocyclus siphonis*.
6. *Tomocyclus simulacrum*.
7– 9. *Liracyclotus psilomitus*.
10–12. *Filocyclus delphinulus*.
13–15. *Buckleyia bicincta*.
16–18. *Buckleyia bifasciata*.
19–21. *Buckleyia martinezi*.

Plate 20

1– 3. *Lagocyclus haematomma*.
4– 5. *Lagocyclus bartletti*.
6– 8. *Lagocyclus antoni*.
9–11. *Lagocyclus crosseanus*.
12–14. *Lagocyclus vasconesi*.
15–17. *Calaperostoma rosenbergi*.
18. *Calaperostoma esmeraldense*.
19. *Calaperostoma guayaquilense*.
20–21. *Calaperostoma purum*.

Plate 21

1– 3. *Calaperostoma bourcieri*.
4– 6. *Calaperostoma chanchapoyasense*.
7– 9. *Calaperostoma pittieri*.
10–12. *Calaperostoma hidalgoi*.

13–15. *Calaperostoma nigrofasciatum.*
16. *Calaperostoma cousini.*
17–19. *Calaperostoma leai.*
20–22. *Calaperostoma cumingi.*

PLATE 22

1– 3. *Cyrtotoma palmeri.*
4– 6. *Cyrtotoma mexicanum.*
7– 9. *Cyrtotoma goldmani.*
10–12. *Cyrtotoma walkeri.*
13–15. *Cyrtotoma fischeri.*
16–18. *Cyrtotoma ignotum.*
19–21. *Cyrtotoma salleanum.*
22–24. *Cyrtotoma avus.*

PLATE 23

1– 3. *Barbacyclus princeps.*
4– 6. *Barbacyclus boucardi.*
7– 9. *Barbacyclus underwoodi.*
10–12. *Calacyclotus atratensis.*
13–15. *Calacyclotus olssoni.*

PLATE 24

1– 3. *Amphicyclotus texturatus.*
4– 6. *Amphicyclotus boucardi.*
7– 9. *Amphicyclotus maleri.*
10–12. *Mexcyclotus cooperi.*
13–15. *Mexcyclotus lutescens.*
16–18. *Megacyclotus palenquensis.*
19–21. *Megacyclotus ponderosus.*

PLATE 25

1–3. *Aperostoma (Incidostoma) pergrandis.*
4–6. *Aperostoma (Incidostoma) malleatum.*
7–9. *Aperostoma (Incidostoma) kobelti.*

PLATE 26

1–3. *Aperostoma (Incidostoma) hedui.*
4–6. *Aperostoma (Incidostoma) incomptum.*
7–9. *Aperostoma (Incidostoma) pizzaroi.*
10–12. *Aperostoma (Incidostoma) pichinchense.*

PLATE 27

1–2. *Aperostoma (Austrocyclotus) peilei.*
3–5. *Aperostoma (Austrocyclotus) panamense.*
6–8. *Aperostoma (Austrocyclotus) limellum.*
9–11. *Aperostoma (Austrocyclotus) stramineum.*
12–14. *Aperostoma (Austrocyclotus) aulari.*
15–17. *Aperostoma (Austrocyclotus) granulatum.*
18–19. *Aperostoma (Austrocyclotus) glaucostomum.*
20–22. *Aperostoma (Incidostoma) stirlingi.*
23–25. *Aperostoma (Incidostoma) nirafe.*
26–28. *Aperostoma (Incidostoma) hitomi.*

PLATE 28

1–3. *Aperostoma* (*Austrocyclotus*) *kugleri.*
4–6. *Aperostoma* (*Austrocyclotus*) *carabobense.*
7–9. *Aperostoma* (*Neocyclotus*) *dysoni ruatanense.*
10–12. *Aperostoma* (*Neocyclotus*) *dysoni ambiguum.*
13–15. *Aperostoma* (*Neocyclotus*) *dysoni aureum.*
16–18. *Aperostoma* (*Austrocyclotus*) *burringtoni.*
19–21. *Aperostoma* (*Neocyclotus*) *dysoni hinkleyi.*
22–24. *Aperostoma* (*Neocyclotus*) *dysoni affine.*
25–27. *Aperostoma* (*Neocyclotus*) *dysoni sumichrasti.*
28–30. *Aperostoma* (*Neocyclotus*) *dysoni dysoni.*
31–33. *Aperostoma* (*Neocyclotus*) *dysoni dyeri.*

PLATE 29

1–3. *Aperostoma* (*Neocyclotus*) *corpulentum.*
4–6. *Aperostoma* (*Neocyclotus*) *dysoni berendti.*
7–9. *Aperostoma* (*Neocyclotus*) *dysoni sallei.*
10–12. *Aperostoma* (*Neocyclotus*) *dysoni cookei.*
13–15. *Aperostoma* (*Neocyclotus*) *chrysacme.*
16–18. *Aperostoma* (*Neocyclotus*) *dysoni nicaraguense.*
19–21. *Aperostoma* (*Neocyclotus*) *dysoni valerioi.*
22–24. *Aperostoma* (*Neocyclotus*) *sanctaemarthae.*

PLATE 30

1–3. *Aperostoma* (*Cyclohidalgoa*) *translucidum translucidum.*
4–6. *Aperostoma* (*Cyclohidalgoa*) *translucidum bejumense.*
7–9. *Aperostoma* (*Cyclohidalgoa*) *translucidum dunoonense.*
10–12. *Aperostoma* (*Cyclohidalgoa*) *translucidum santaguitense.*
13–15. *Aperostoma* (*Cyclohidalgoa*) *translucidum major.*
16–18. *Aperostoma* (*Cyclohidalgoa*) *translucidum trinitense.*
19–21. *Aperostoma* (*Cyclohidalgoa*) *translucidum pygmaeum.*
22. *Aperostoma* (*Neocyclotus*) *smithi.*
23. *Aperostoma* (*Cyclohidalgoa*) *belli belli.*
24–26. *Aperostoma* (*Cyclohidalgoa*) *belli haughti.*
27. *Aperostoma* (*Neocyclotus*) *smithi.*

PLATE 31

1–3. *Aperostoma* (*Aperostoma*) *umbilicatum.*
4–6. *Aperostoma* (*Aperostoma*) *bogotense.*
7–9. *Aperostoma* (*Aperostoma*) *paezense.*
10–12. *Aperostoma* (*Aperostoma*) *inconspicuum.*
13–15. *Aperostoma* (*Aperostoma*) *simile.*
16–18. *Aperostoma* (*Aperostoma*) *veracochanum.*
19–21. *Aperostoma* (*Aperostoma*) *cumingi.*
22–24. *Aperostoma* (*Aperostoma*) *cingulatum.*

PLATE 32

1– 3. *Aperostoma* (*Aperostoma*) *dunkeri.*
4– 6. *Aperostoma* (*Aperostoma*) *allantayum.*
7– 9. *Aperostoma* (*Aperostoma*) *paitaense.*
10–12. *Aperostoma* (*Aperostoma*) *exiguum.*

13–15. *Aperostoma* (*Aperostoma*) *paezicolum.*
16–18. *Aperostoma* (*Aperostoma*) *costaricense.*
19–21. *Aperostoma* (*Aperostoma*) *carmioli.*

PLATE 33

1–3. *Aperostoma* (*Aperostoma*) *confusum.*
4. *Aperostoma* (*Aperostoma*) *irregulare.*
5–6. *Aperostoma* (*Aperostoma*) *bisinuatum.*
7–9. *Aperostoma* (*Aperostoma*) *giganteum.*

PLATE 34

1– 3. *Aperostoma* (*Aperostoma*) *fischeri.*
4– 6. *Aperostoma* (*Aperostoma*) *utriaense.*
7– 9. *Aperostoma* (*Aperostoma*) *portobellense.*
10–12. *Aperostoma* (*Aperostoma*) *manabense.*
13–15. *Aperostoma* (*Aperostoma*) *brujense.*

PLATE 35

1– 3. *Aperostoma* (*Aperostoma*) *fultoni.*
4– 6. *Aperostoma* (*Aperostoma*) *amazonense.*
7– 9. *Aperostoma* (*Aperostoma*) *blanchetianum.*
10–12. *Aperostoma* (*Aperostoma*) *peruense.*
13. *Aperostoma* (*Aperostoma*) *laxatum.*
14–16. *Aperostoma* (*Aperostoma*) *depressum.*
17–19. *Aperostoma* (*Aperostoma*) *leai.*
20–22. *Aperostoma* (*Aperostoma*) *venezuelense.*

PLATE 36

1–3. *Aperostoma* (*Aperostoma*) *subcingulatum.*
4–6. *Aperostoma* (*Aperostoma*) *ecuadorense.*
7–9. *Aperostoma* (*Aperostoma*) *castaneum.*
10–12. *Aperostoma* (*Aperostoma*) *olivaceum.*
13–15. *Aperostoma* (*Aperostoma*) *quitense.*
16–18. *Aperostoma* (*Aperostoma*) *peruvianum.*

PLATE 37

1–3. *Aperostoma* (*Aperostoma*) *masvense.*
4–6. *Aperostoma* (*Aperostoma*) *agassizi.*
7–9. *Aperostoma* (*Aperostoma*) *fasciatum.*
10–11. *Aperostoma* (*Aperostoma*) *caucaense.*
12–14. *Aperostoma* (*Aperostoma*) *pazi.*
15–17. *Aperostoma* (*Aperostoma*) *nevadense.*
18–20. *Aperostoma* (*Aperostoma*) *salengoense.*

PLATE 38

1–3. *Aperostoma* (*Aperostoma*) *currani.*
4–6. *Aperostoma* (*Aperostoma*) *perezi.*
7–9. *Aperostoma* (*Aperostoma*) *boliviense.*
10–12. *Aperostoma* (*Aperostoma*) *redfieldi.*
13–15. *Aperostoma* (*Aperostoma*) *nanum.*
16–18. *Aperostoma* (*Aperostoma*) *pulchellum.*
19–21. *Aperostoma* (*Aperostoma*) *merrilli.*
22–24. *Aperostoma* (*Aperostoma*) *colombiense.*

PLATE 39

1–3. *Aperostoma (Aperostoma) balsasense.*
4–6. *Aperostoma (Aperostoma) cardozi.*
7–9. *Incerticyclus prominulus.*
10. *Incerticyclus connivens.*
11. *Incerticyclus distinctus.*
12. *Aperostoma (Aperostoma) inca.*
13. *Incerticyclus braziliensis.*
14–16. *Aperostoma (Aperostoma) filoliratum.*
17–19. *Aperostoma (Aperostoma) popayanum*, type.
20–22. *Aperostoma (Aperostoma) popayanum.*

PLATE 40

1. *Adelopoma tucma.*
2–3. *Adelopoma stolli.*
4. *Adelopoma costaricense.*
5. *Adelopoma bakeri.*
6. *Adelopoma occidentale.*
7–9. *Aperostoma (Cyclopomops) moricandi.*

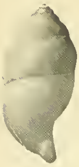
PLATE 41

1–3. *Lagocyclus haematomma.*
4–6. *Incerticyclus bowdenensis.*
7–9. *Crocidopoma (Crocidopoma) casuelense.*
10–12. *Incerticyclus schermoi.*
13–15. *Aperostoma (Neocyclotus) wetmorei.*

PLATE 42

Opercula

1– 3. *Poteria (Cyclobakeria) dentistigmata.*
4– 5. *Aperostoma (Cycladamsia) seminudum seminudum.*
6– 7. *Cyclopilsbrya (Cyclocaymania) fonticula.*
8–10. *Ptychocochlis martensi.*
11–13. *Cyclopilsbrya (Cyclopilsbrya) jugosa.*
14–15. *Poteria (Poteria) lineata lineata.*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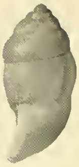
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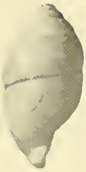
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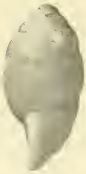
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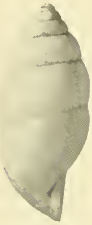
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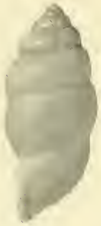
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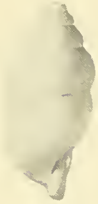
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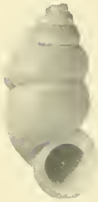
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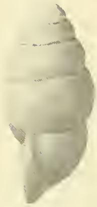
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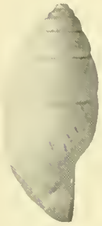
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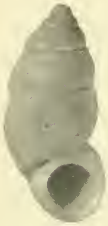
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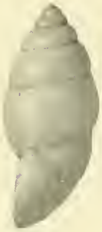
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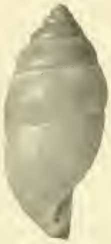
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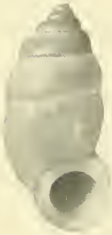
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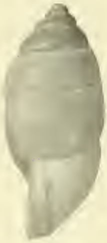
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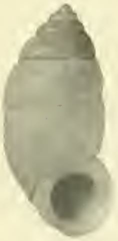
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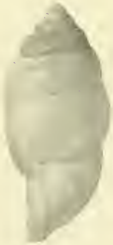
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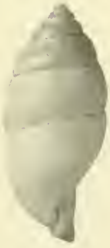
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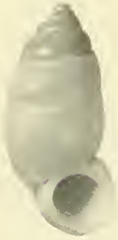
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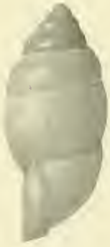
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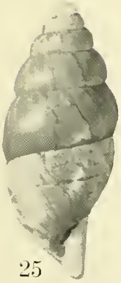
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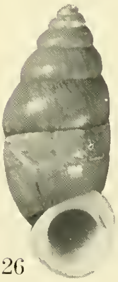
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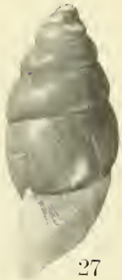
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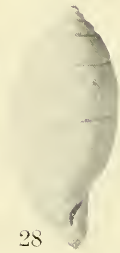
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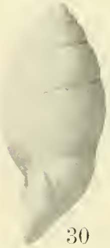
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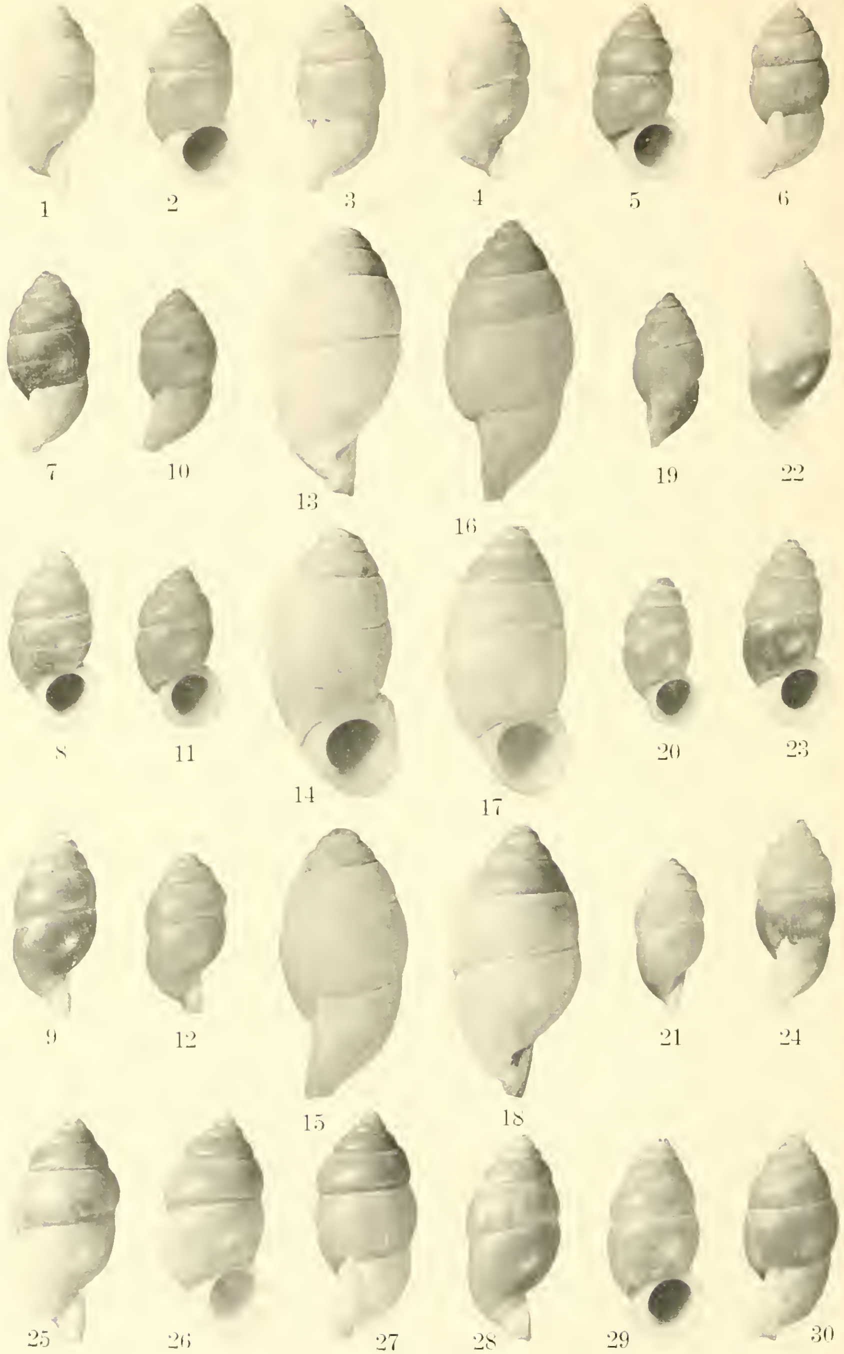
Cyclophorid Mollusks of America.

For explanation of plate see page 233.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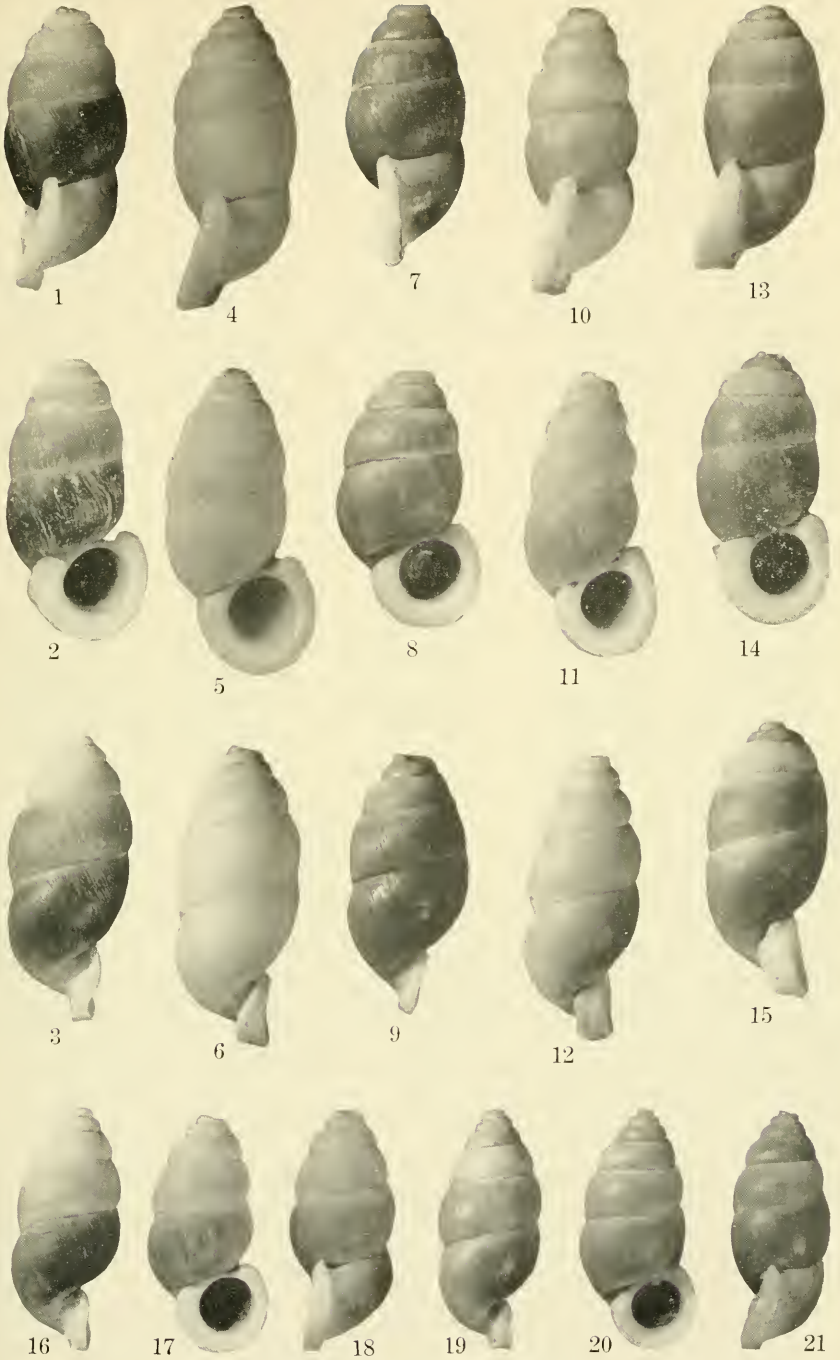
Cyclophorid Mollusks of America.

For explanation of plate see page 283.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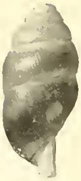
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 283.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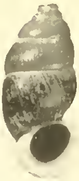
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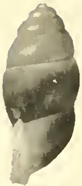
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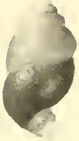
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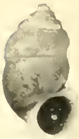
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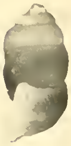
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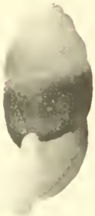
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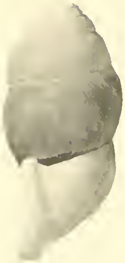
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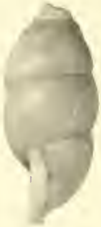
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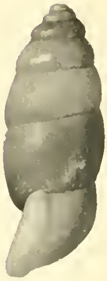
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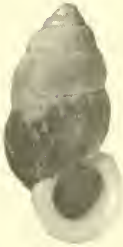
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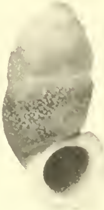
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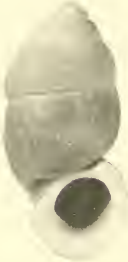
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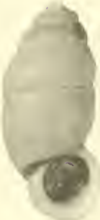
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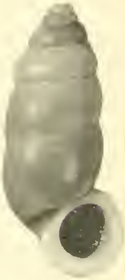
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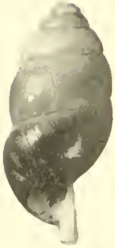
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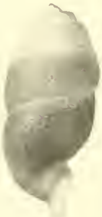
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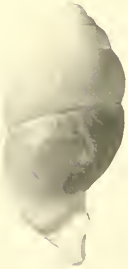
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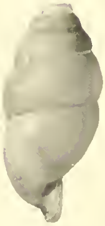
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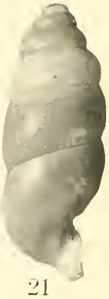
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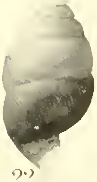
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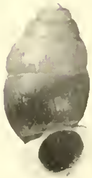
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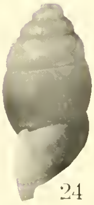
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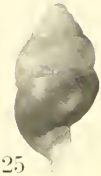
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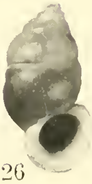
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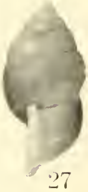
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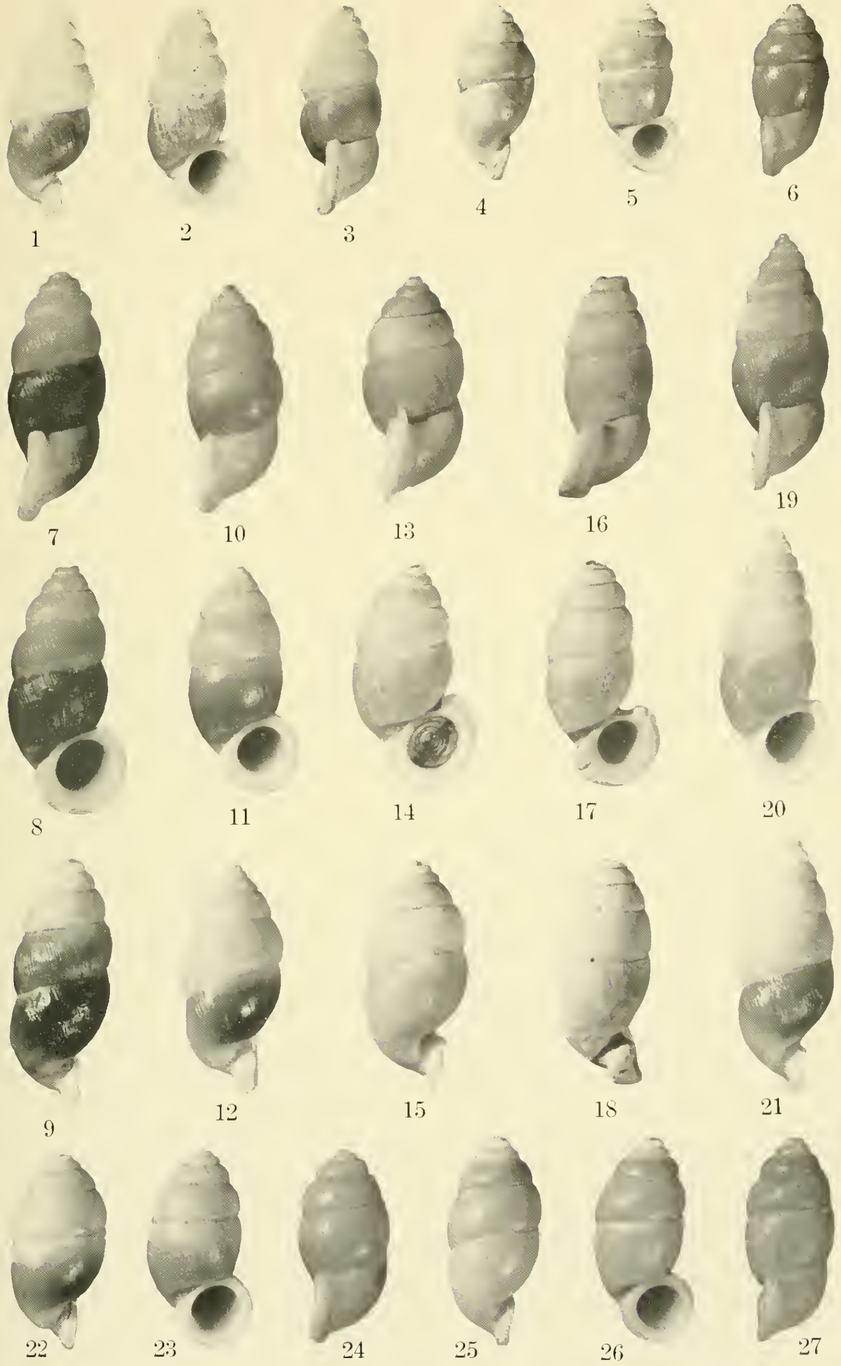
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 283.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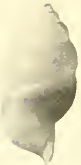
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 284.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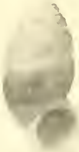
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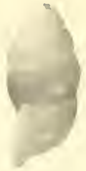
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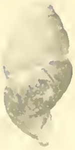
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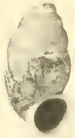
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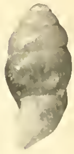
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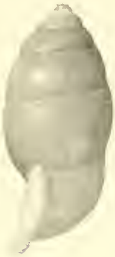
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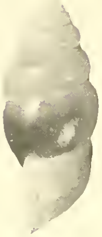
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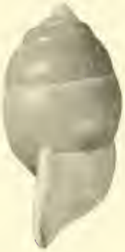
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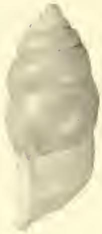
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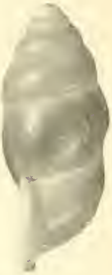
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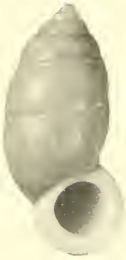
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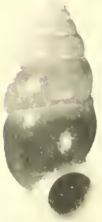
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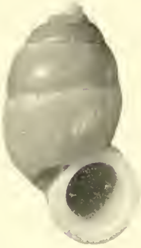
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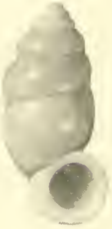
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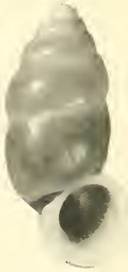
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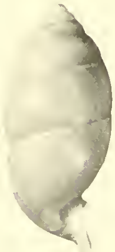
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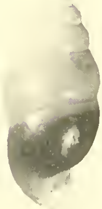
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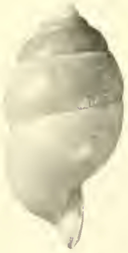
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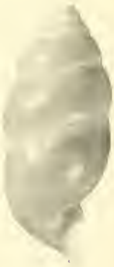
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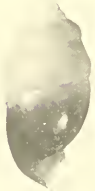
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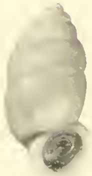
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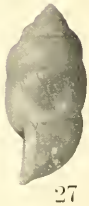
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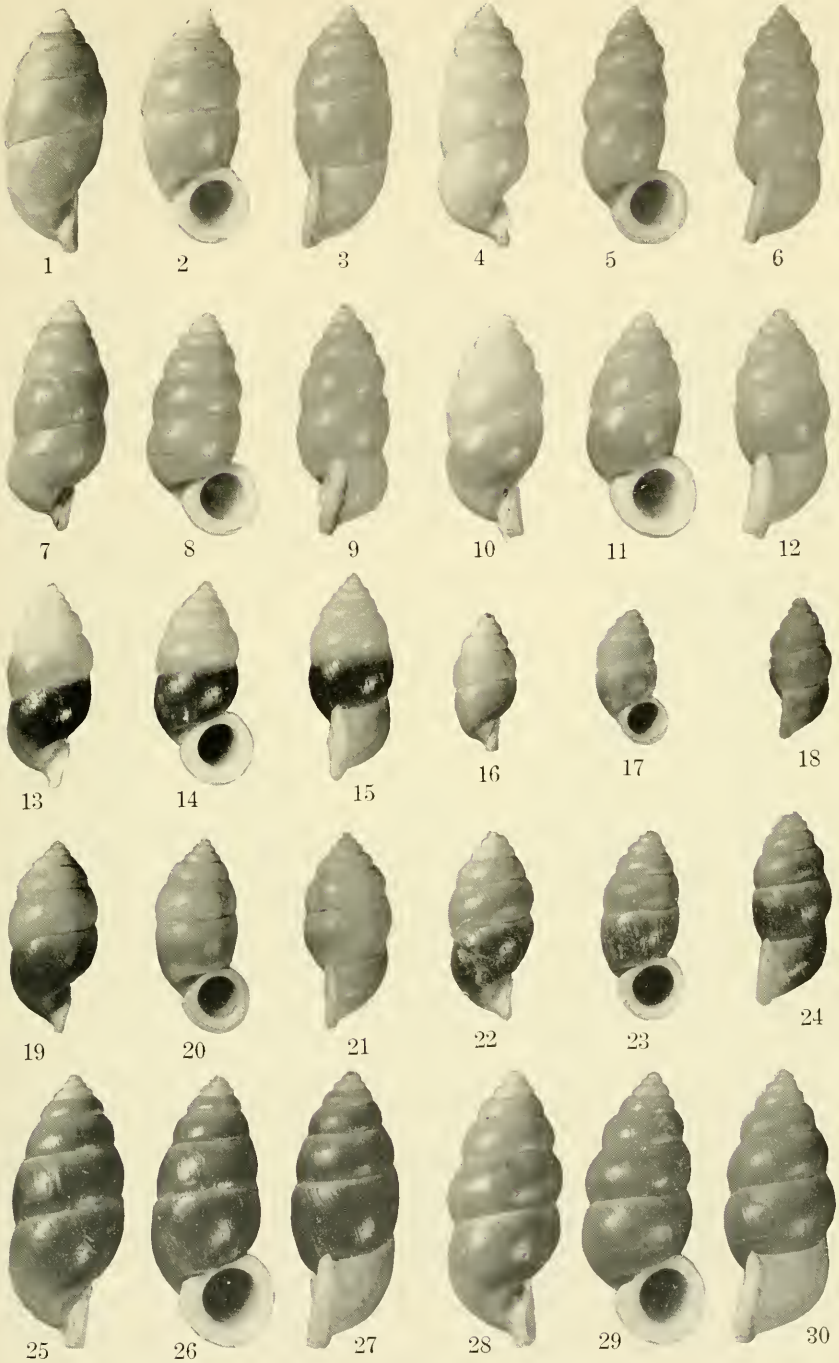
Cyclophorid Mollusks of America.

FOR EXPLANATION OF PLATE SEE PAGE 284.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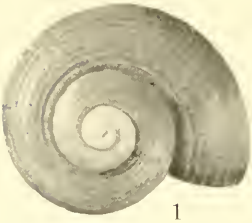
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANAT.ON OF PLATE SEE PAGE 284.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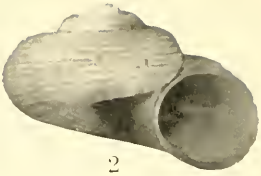
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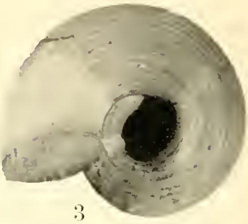
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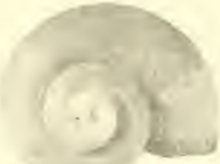
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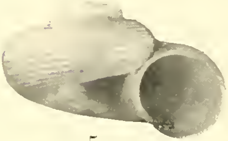
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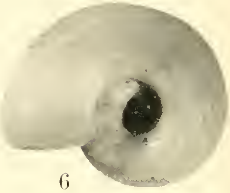
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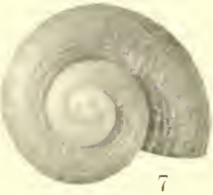
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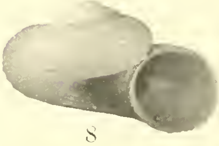
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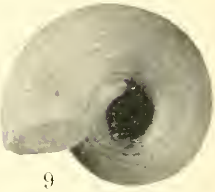
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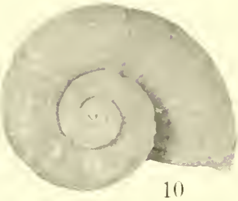
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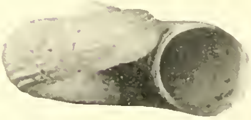
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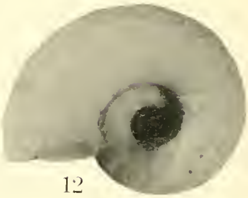
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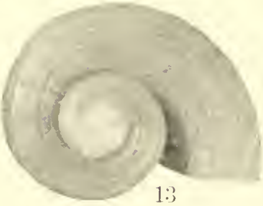
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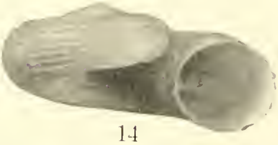
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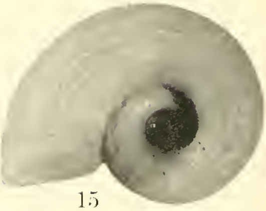
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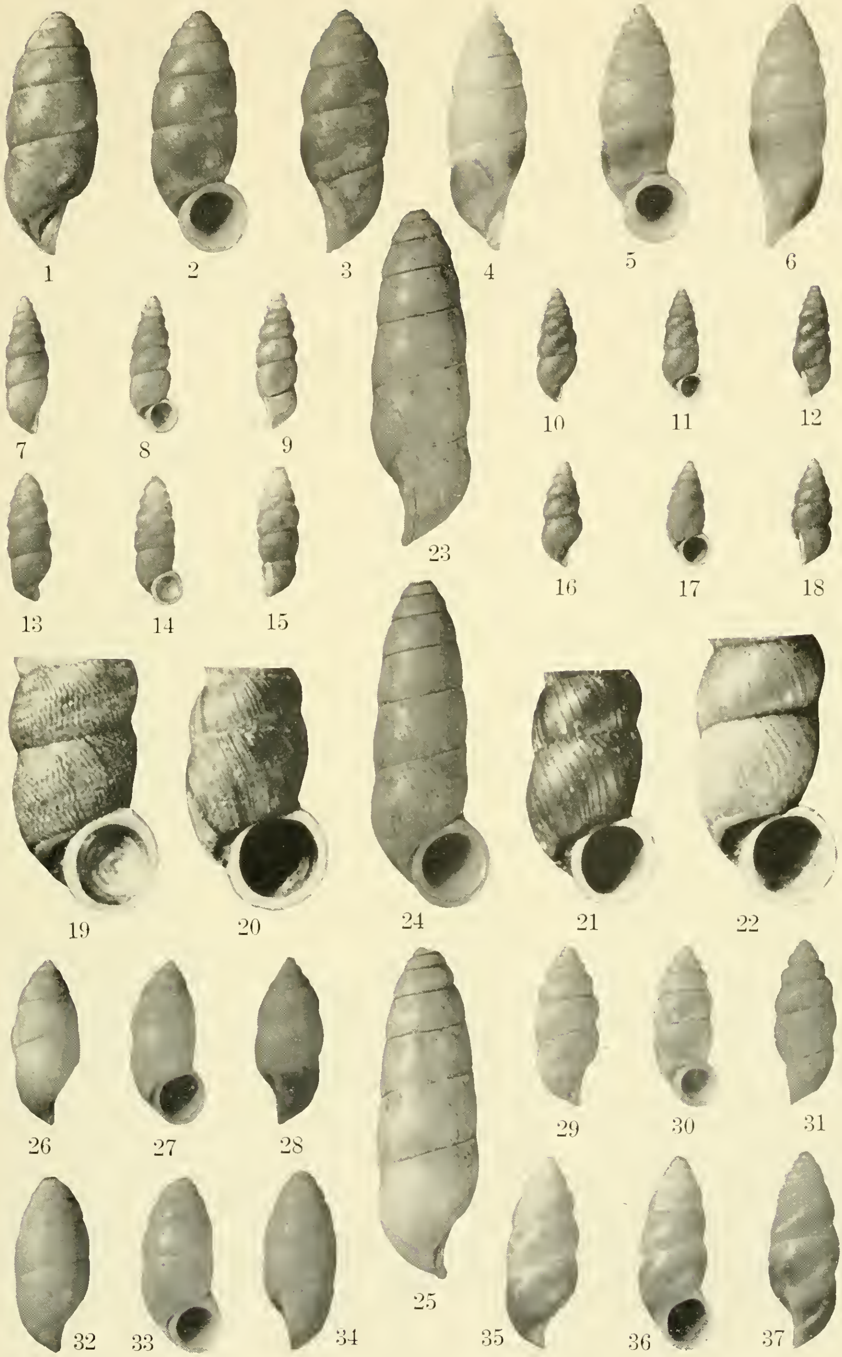
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 284.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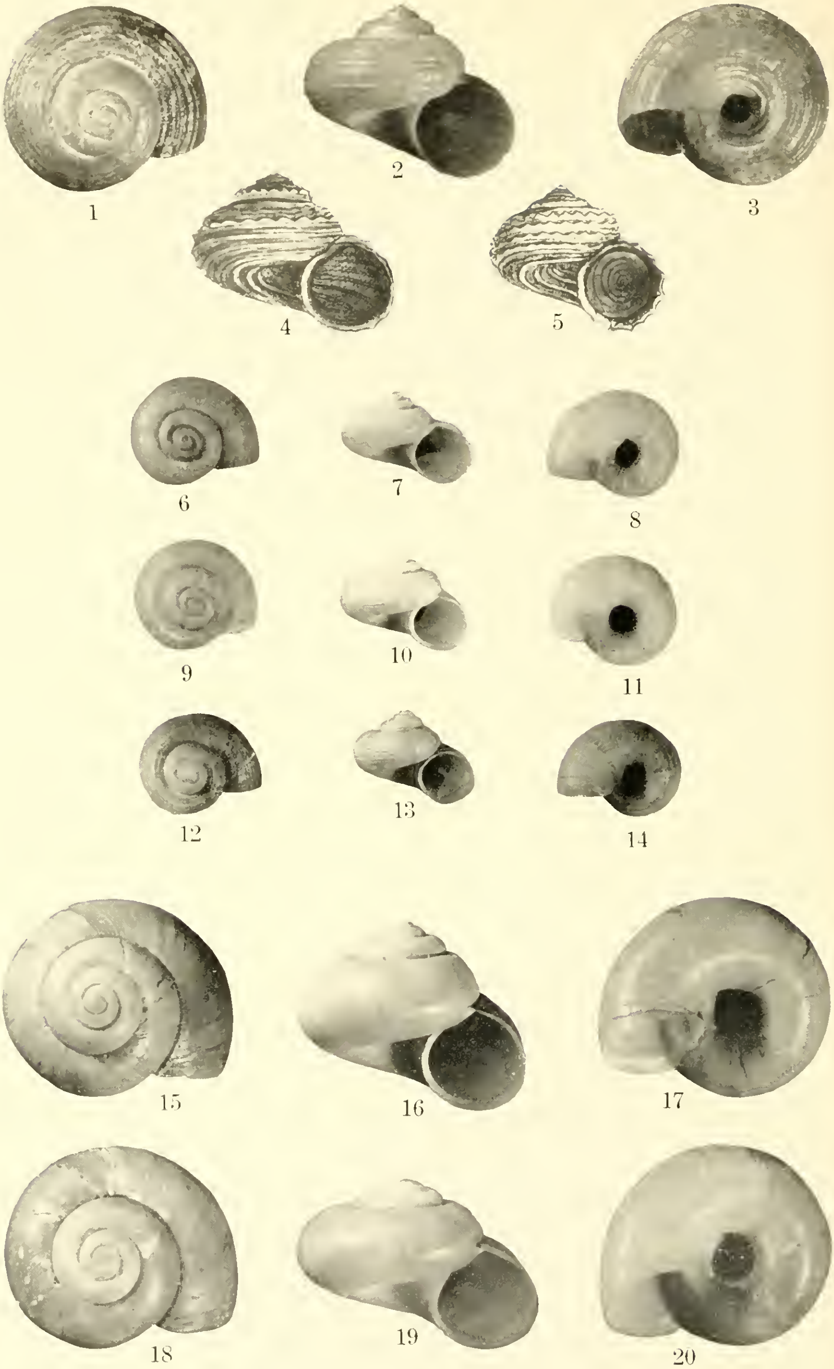
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGES 284, 285.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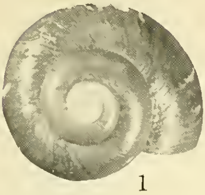
Cyclophorid Mollusks of America.

For explanation of plate see page 285.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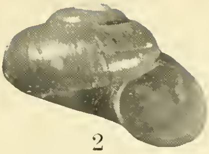
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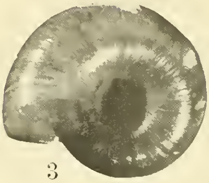
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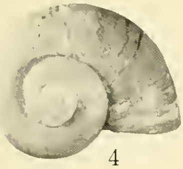
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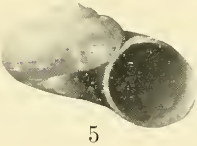
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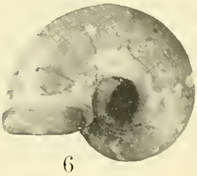
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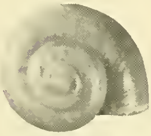
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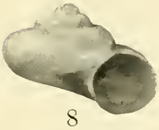
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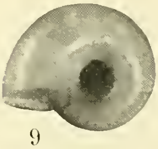
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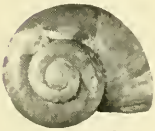
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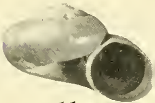
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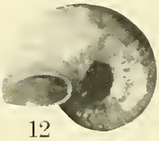
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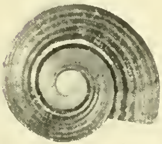
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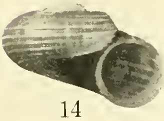
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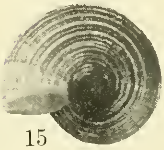
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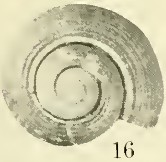
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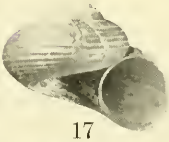
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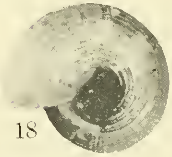
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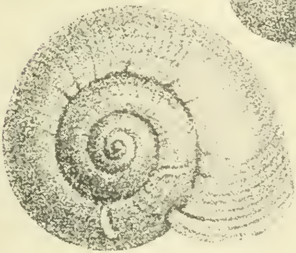
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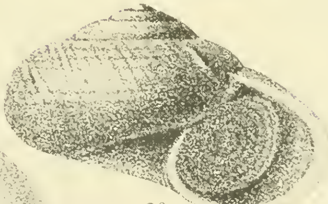
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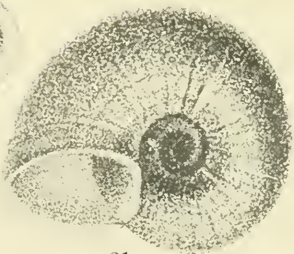
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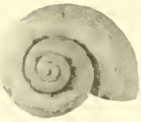
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 285.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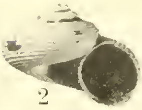
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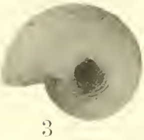
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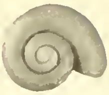
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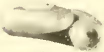
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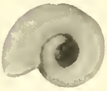
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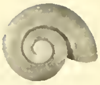
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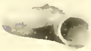
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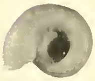
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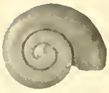
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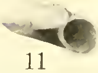
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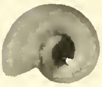
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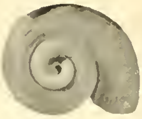
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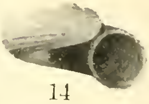
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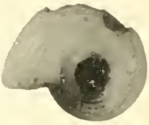
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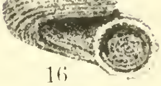
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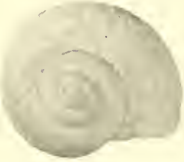
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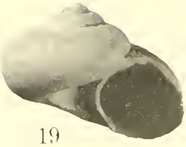
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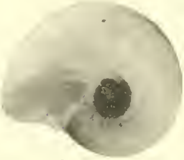
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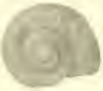
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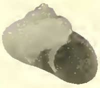
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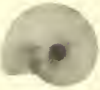
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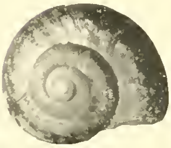
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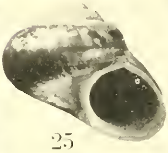
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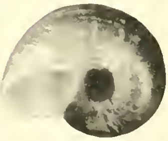
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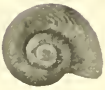
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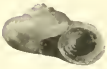
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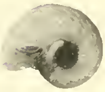
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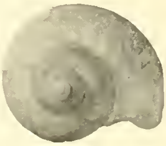
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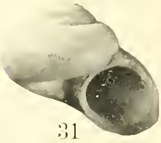
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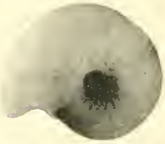
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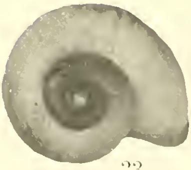
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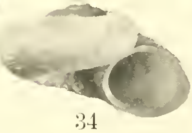
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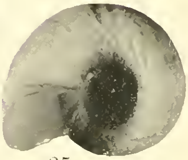
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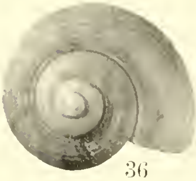
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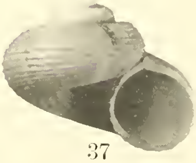
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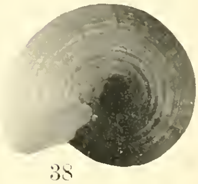
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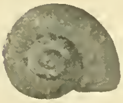
Cyclophorid Mollusks of America.

For explanation of plate see page 285.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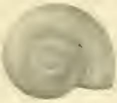
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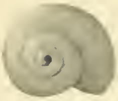
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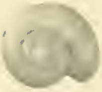
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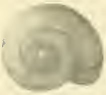
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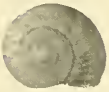
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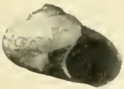
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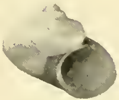
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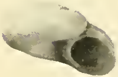
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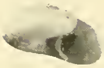
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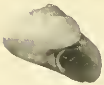
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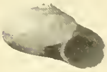
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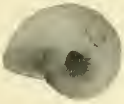
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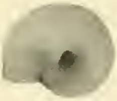
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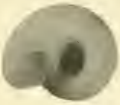
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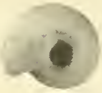
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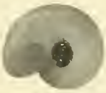
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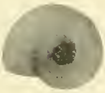
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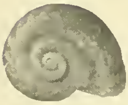
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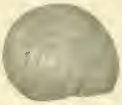
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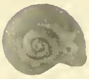
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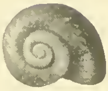
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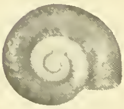
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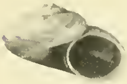
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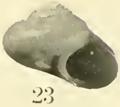
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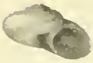
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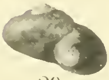
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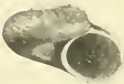
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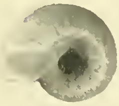
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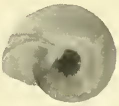
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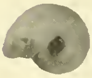
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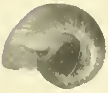
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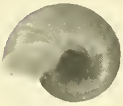
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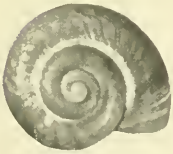
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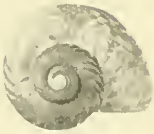
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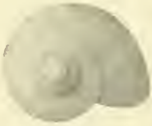
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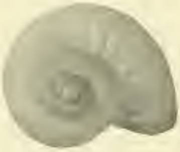
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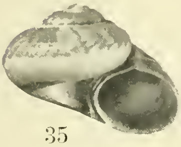
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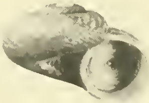
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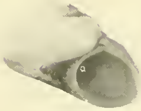
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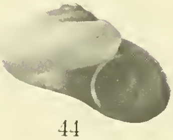
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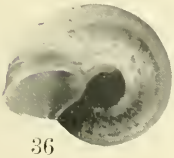
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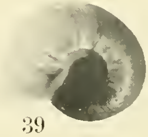
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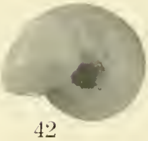
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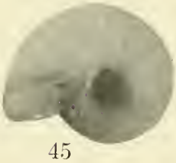
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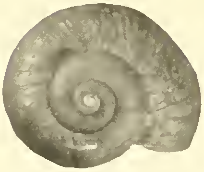
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGES 285, 286.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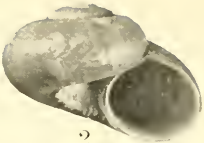
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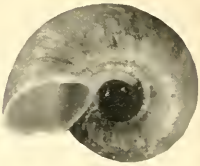
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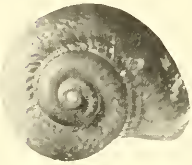
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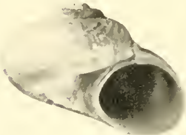
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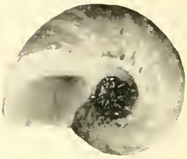
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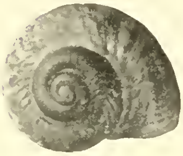
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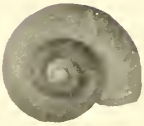
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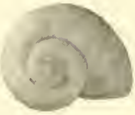
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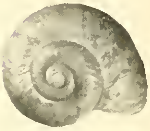
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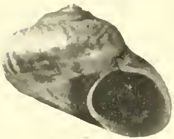
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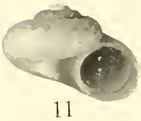
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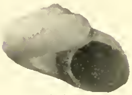
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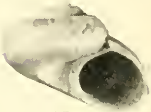
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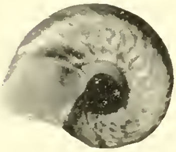
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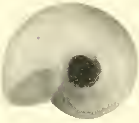
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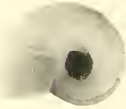
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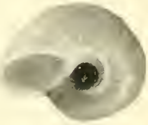
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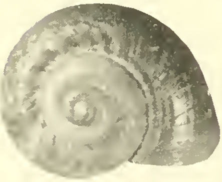
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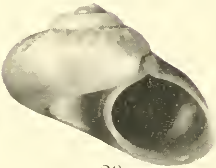
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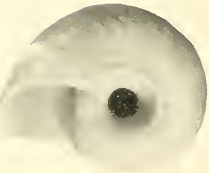
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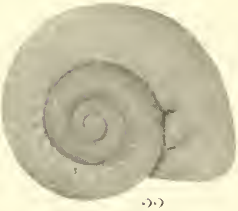
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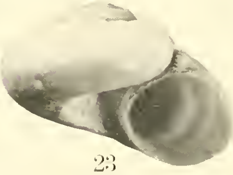
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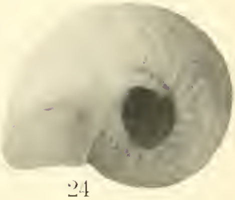
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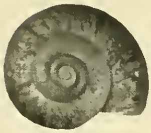
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 286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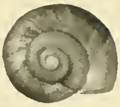
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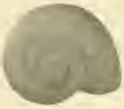
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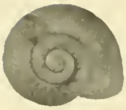
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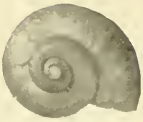
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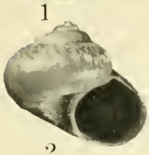
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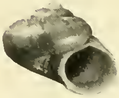
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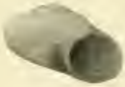
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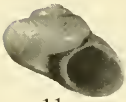
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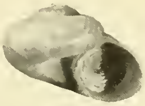
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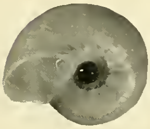
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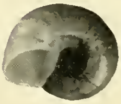
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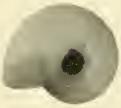
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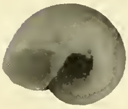
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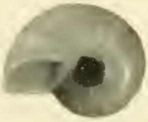
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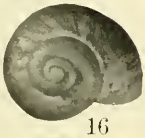
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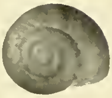
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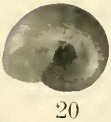
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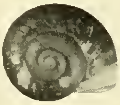
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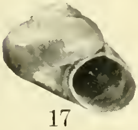
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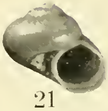
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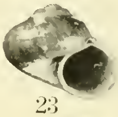
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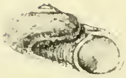
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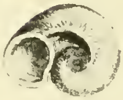
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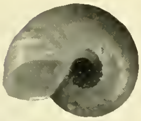
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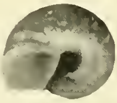
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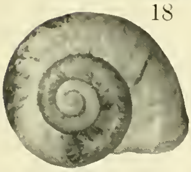
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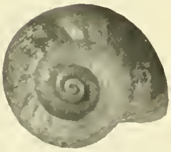
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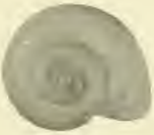
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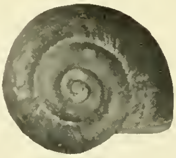
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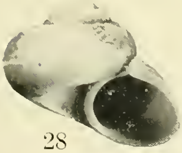
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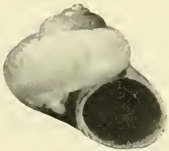
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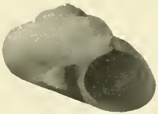
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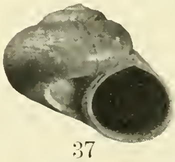
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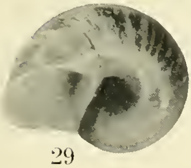
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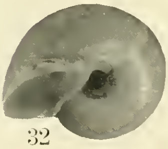
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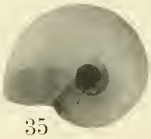
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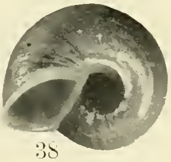
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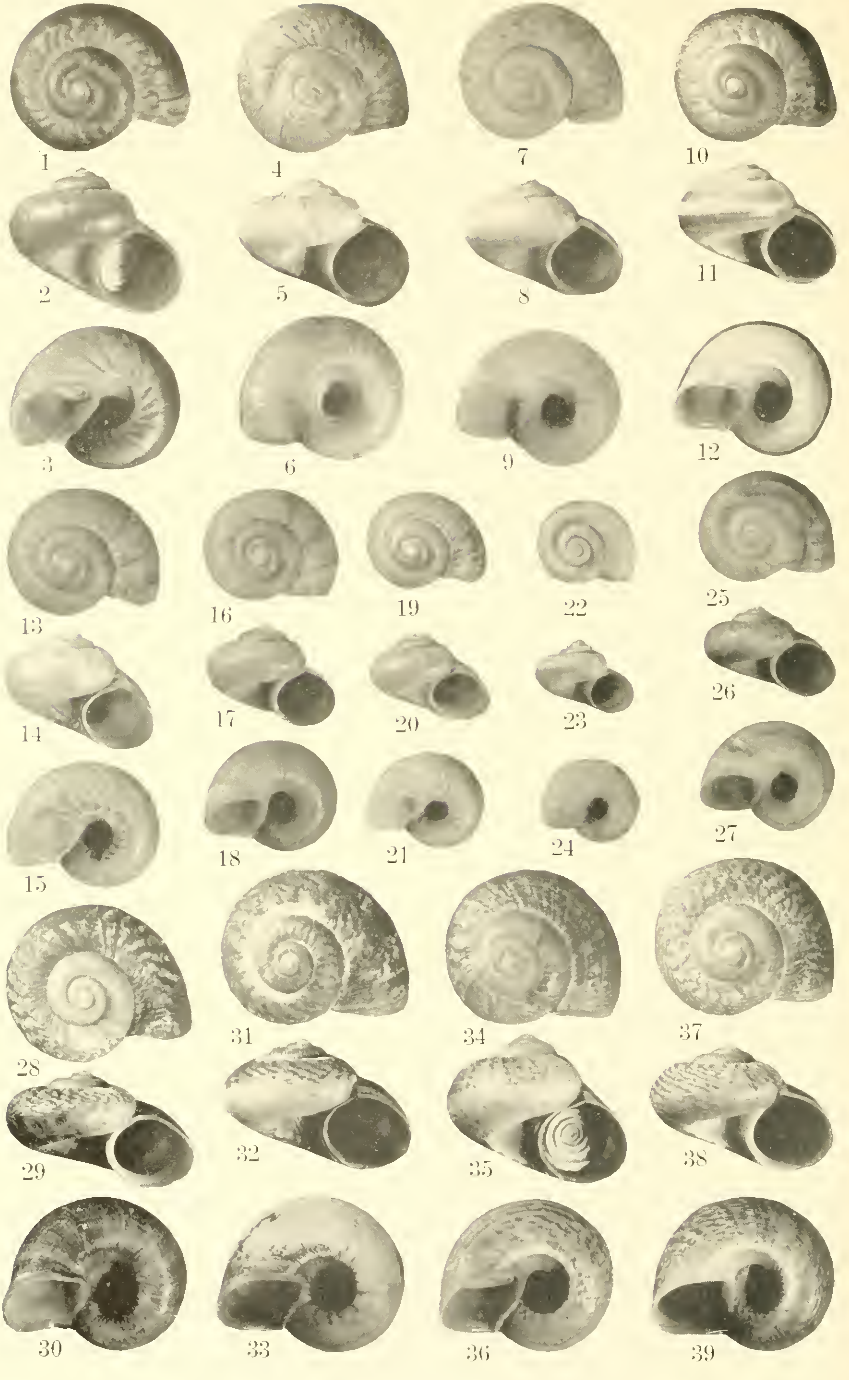
Cyclophorid Mollusks of America.

FOR EXPLANATION OF PLATE SEE PAGE 286.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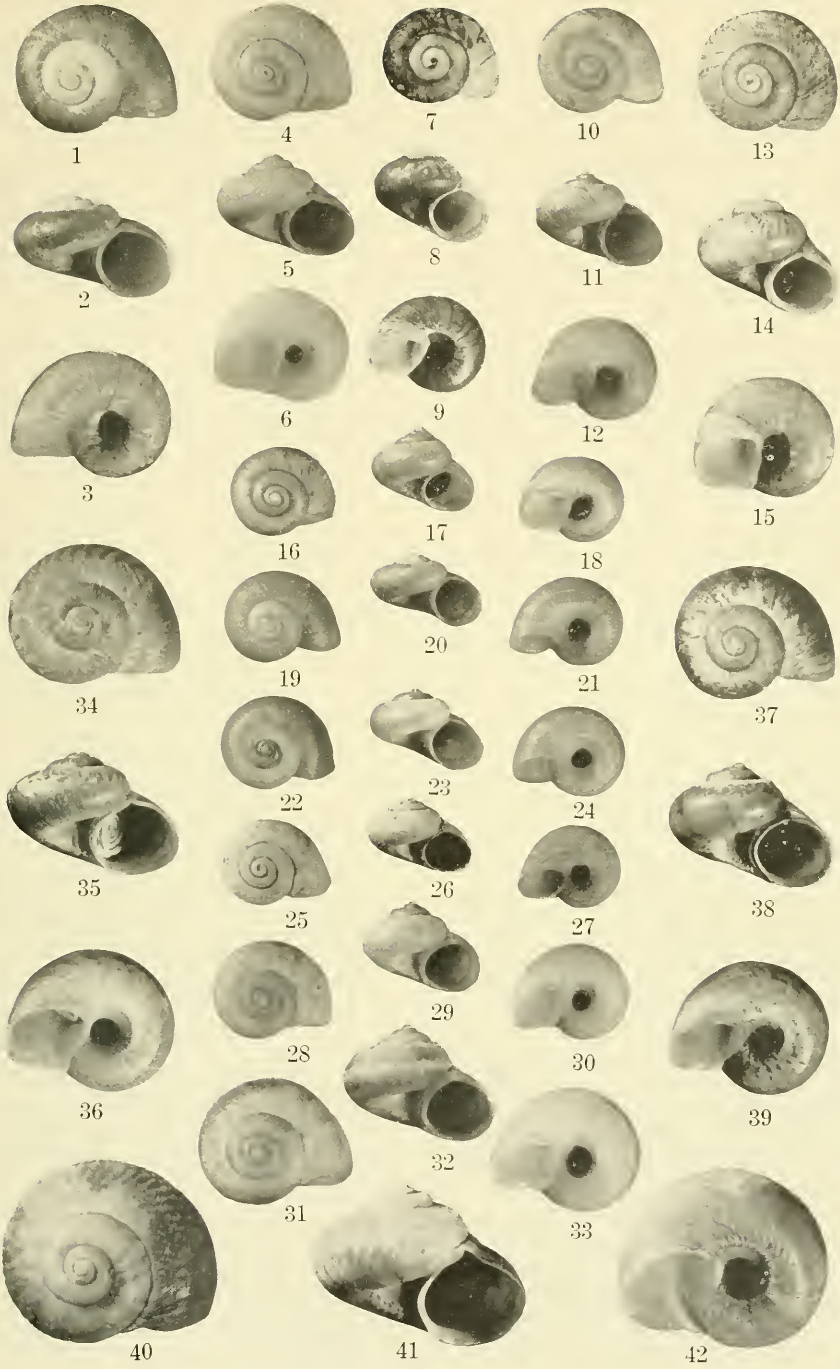
Cyclophorid Mollusks of America.

For explanation of plate see page 286.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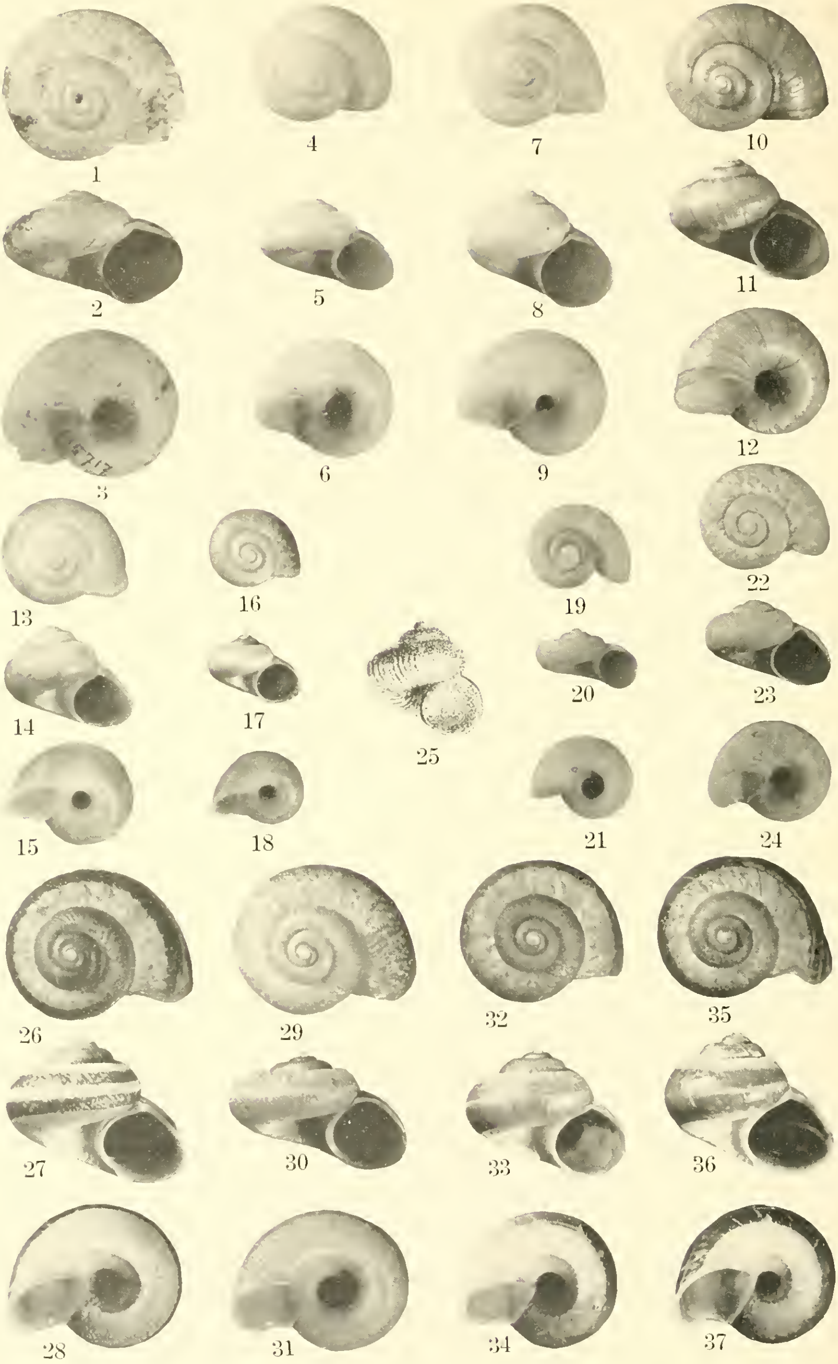
Cyclophorid Mollusks of America.

For explanation of plate see pages 286, 287.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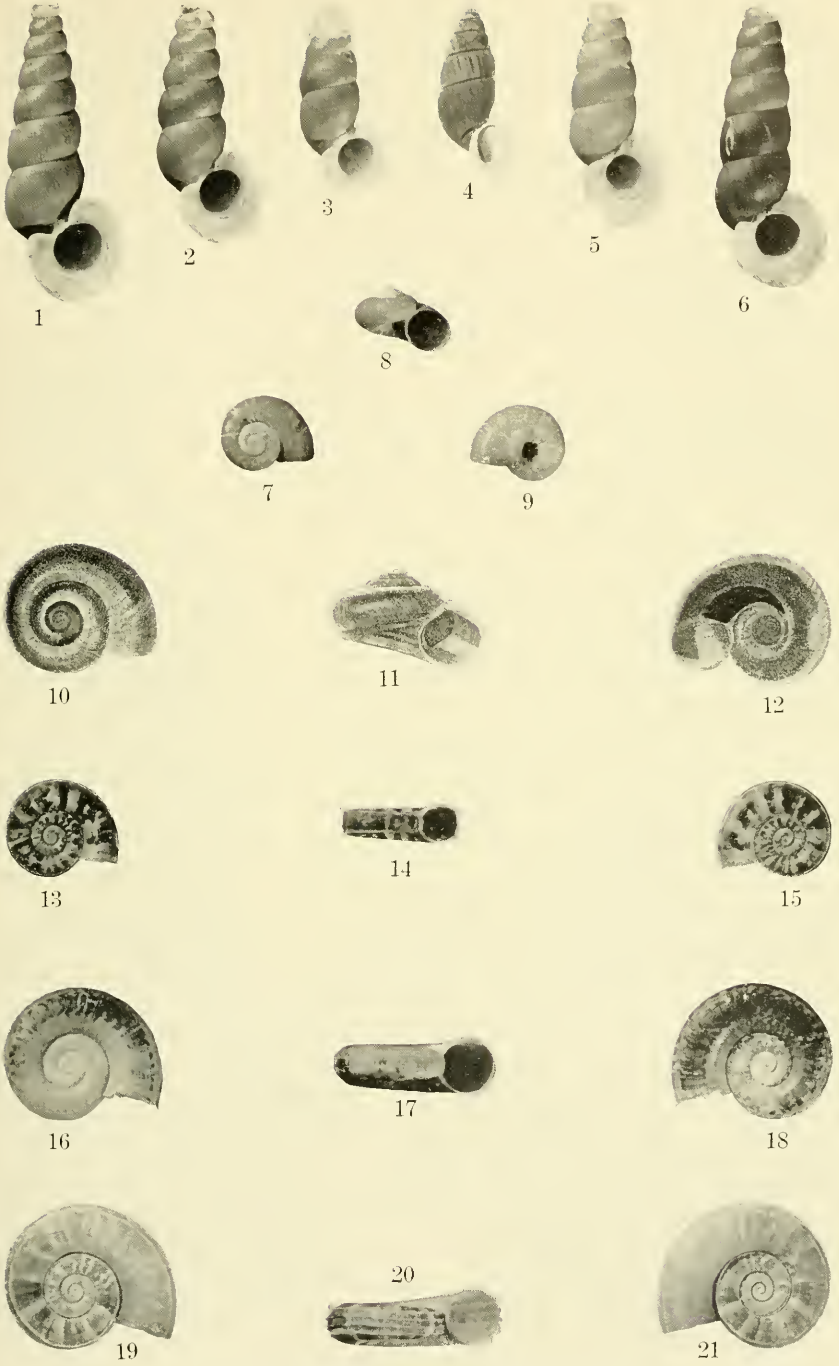
Cyclophorid Mollusks of America.

For explanation of plate see page 287.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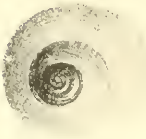
Cyclophorid Mollusks of America.

For explanation of plate see page 287.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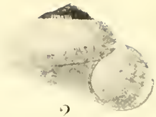
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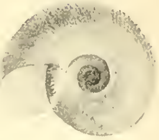
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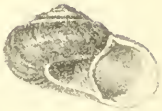
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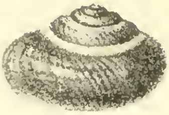
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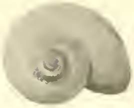
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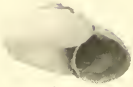
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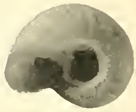
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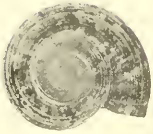
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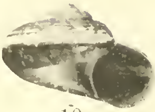
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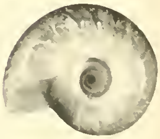
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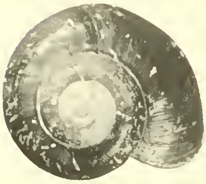
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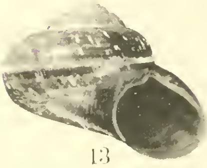
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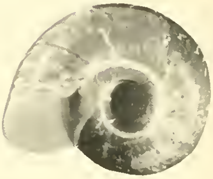
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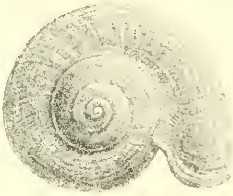
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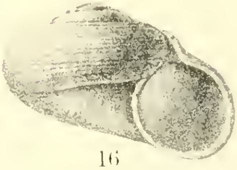
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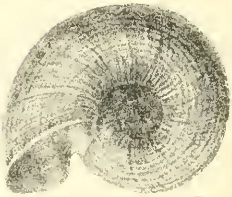
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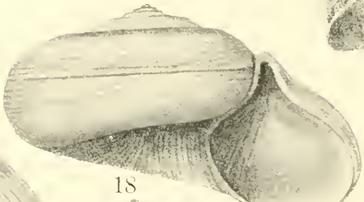
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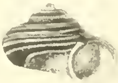
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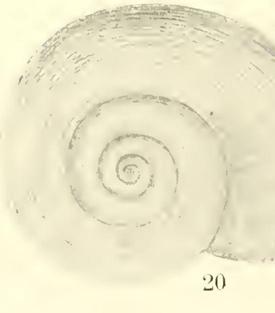
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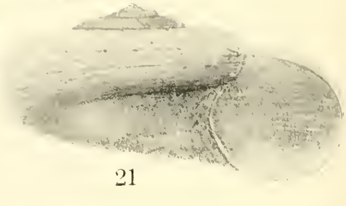
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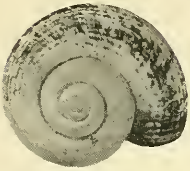
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 287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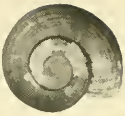
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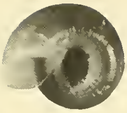
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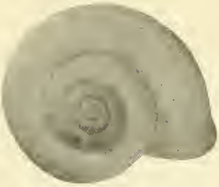
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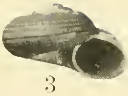
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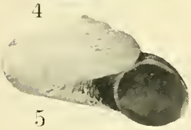
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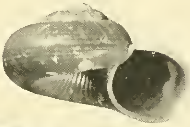
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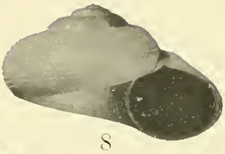
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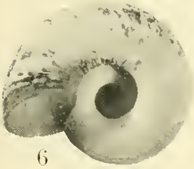
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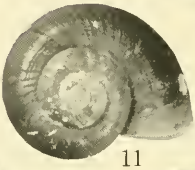
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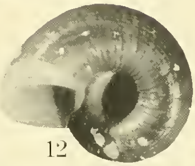
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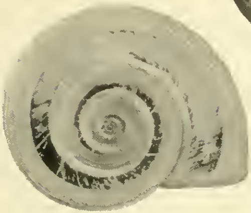
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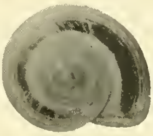
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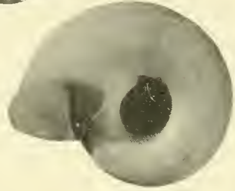
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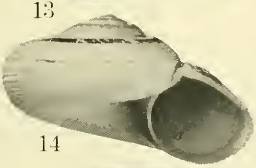
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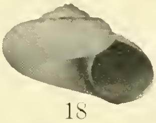
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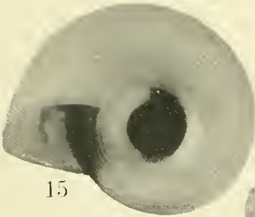
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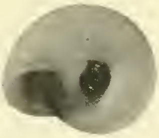
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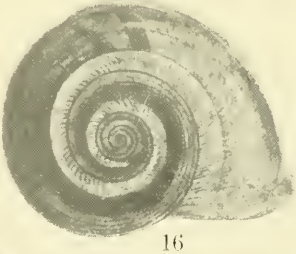
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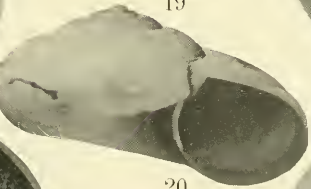
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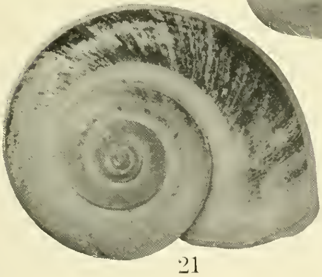
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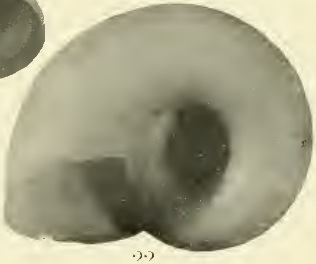
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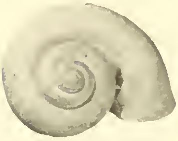
Cyclophorid Mollusks of America.

For explanation of plate see pages 287, 288.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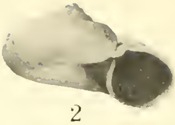
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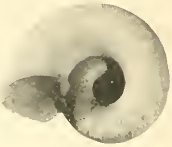
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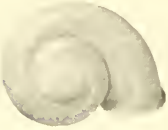
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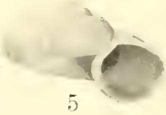
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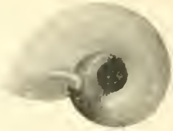
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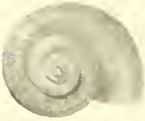
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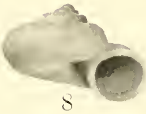
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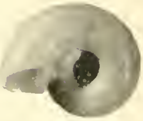
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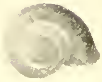
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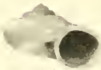
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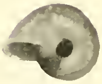
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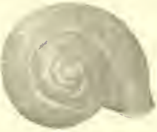
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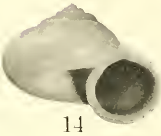
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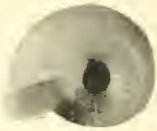
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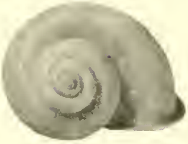
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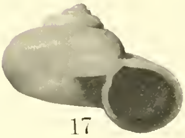
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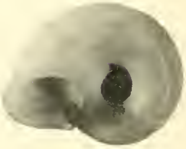
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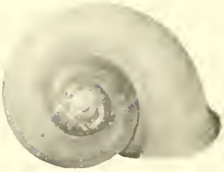
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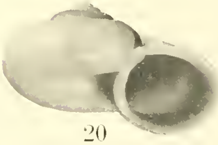
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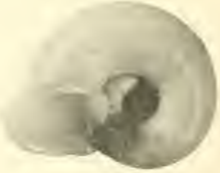
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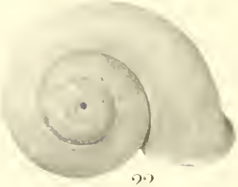
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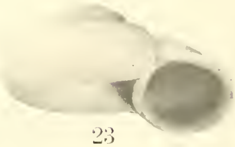
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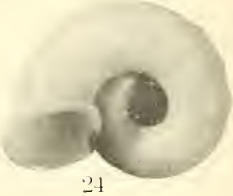
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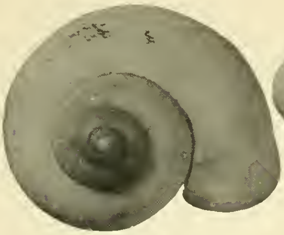
Cyclophorid Mollusks of America.

FOR EXPLANATION OF PLATE SEE PAGE 288.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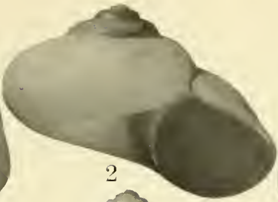
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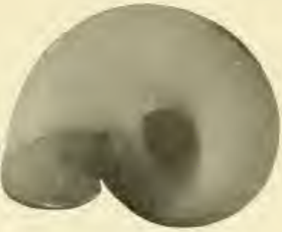
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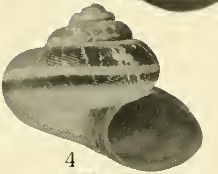
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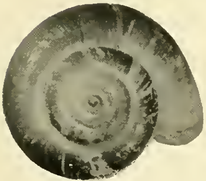
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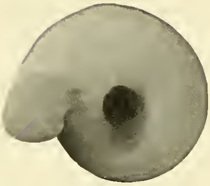
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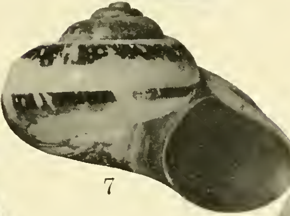
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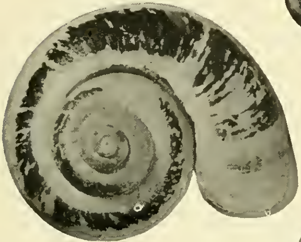
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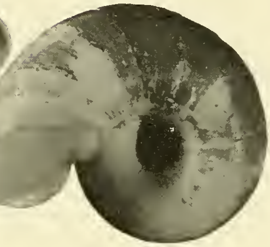
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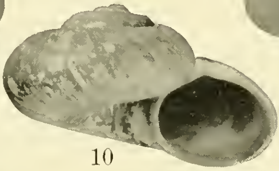
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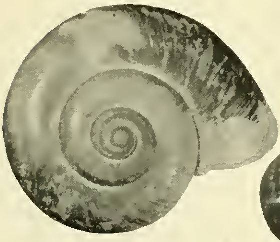
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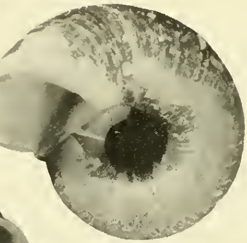
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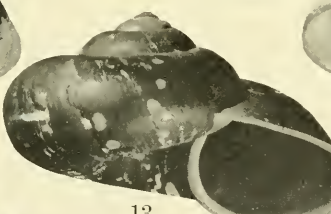
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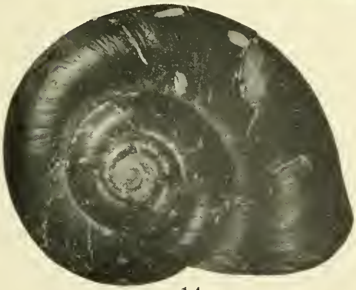
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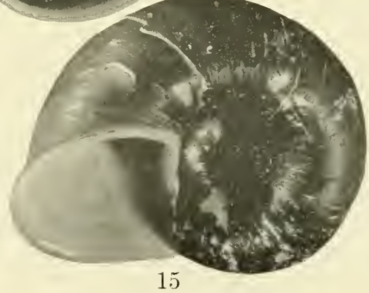
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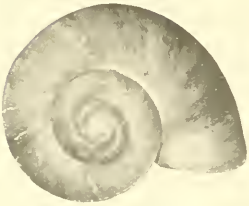
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 288.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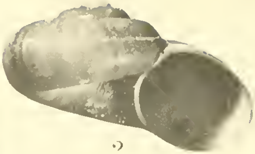
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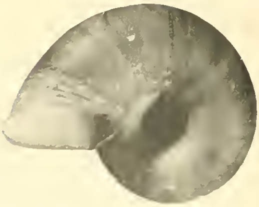
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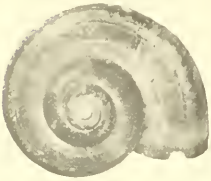
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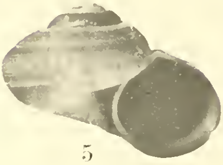
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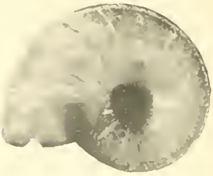
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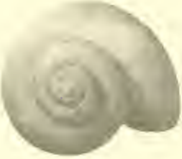
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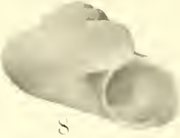
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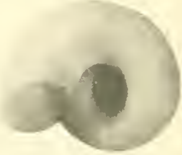
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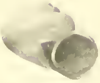
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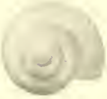
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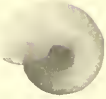
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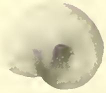
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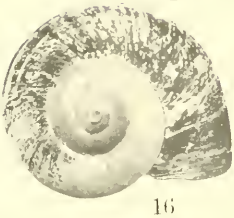
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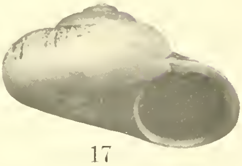
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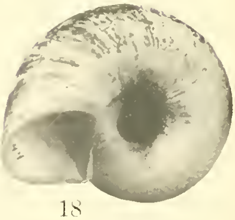
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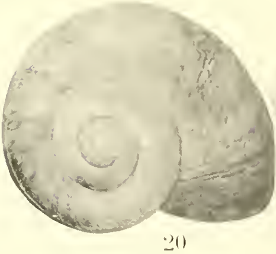
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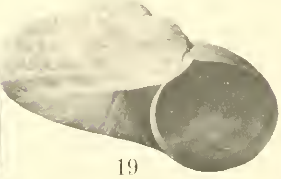
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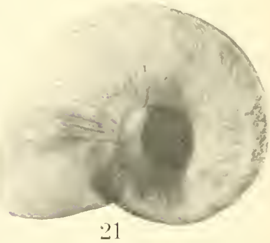
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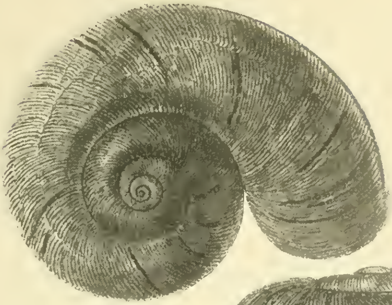
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 288.



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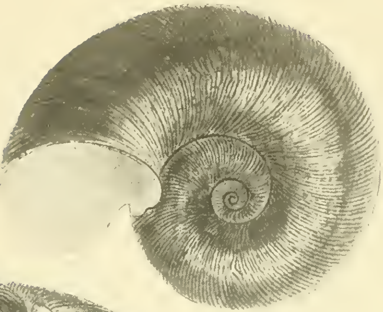

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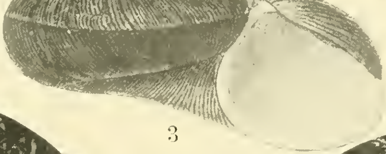

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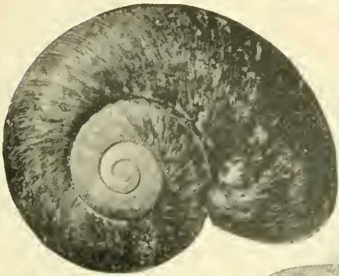

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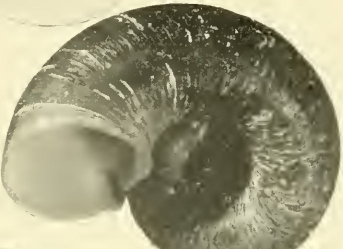

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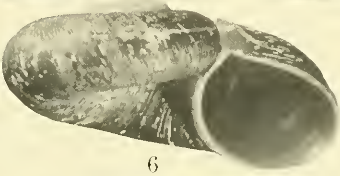

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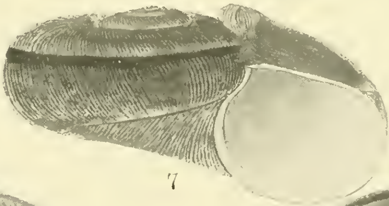

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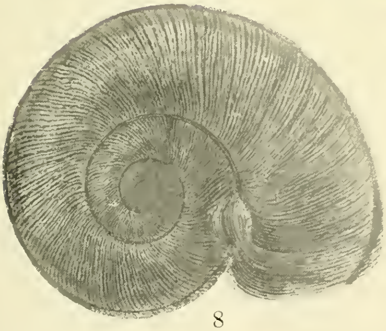

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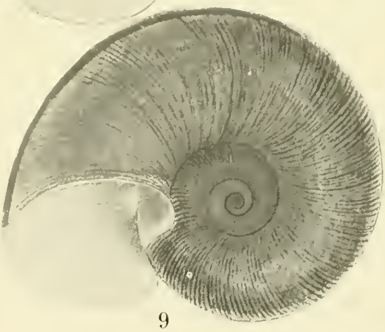

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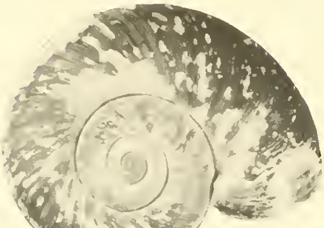
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 288.



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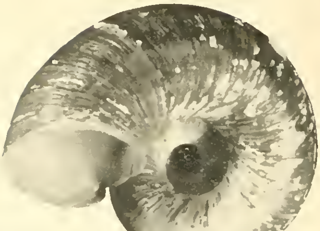

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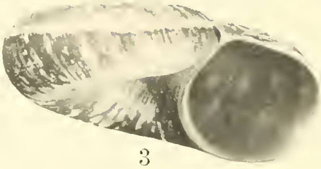

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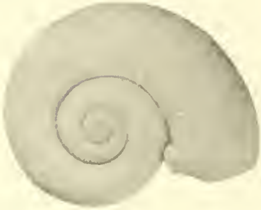

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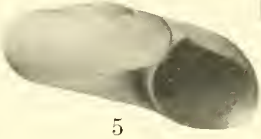

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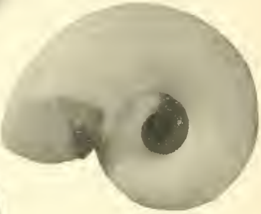

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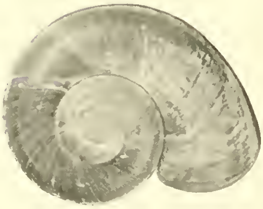

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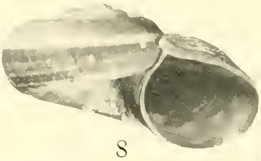

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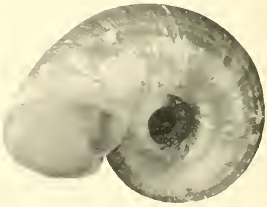

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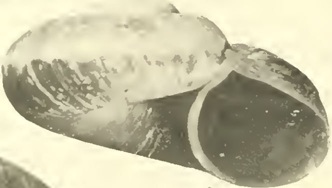

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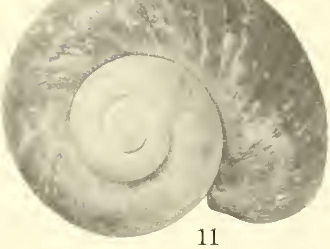

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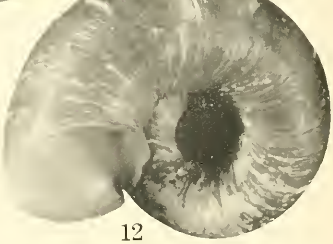

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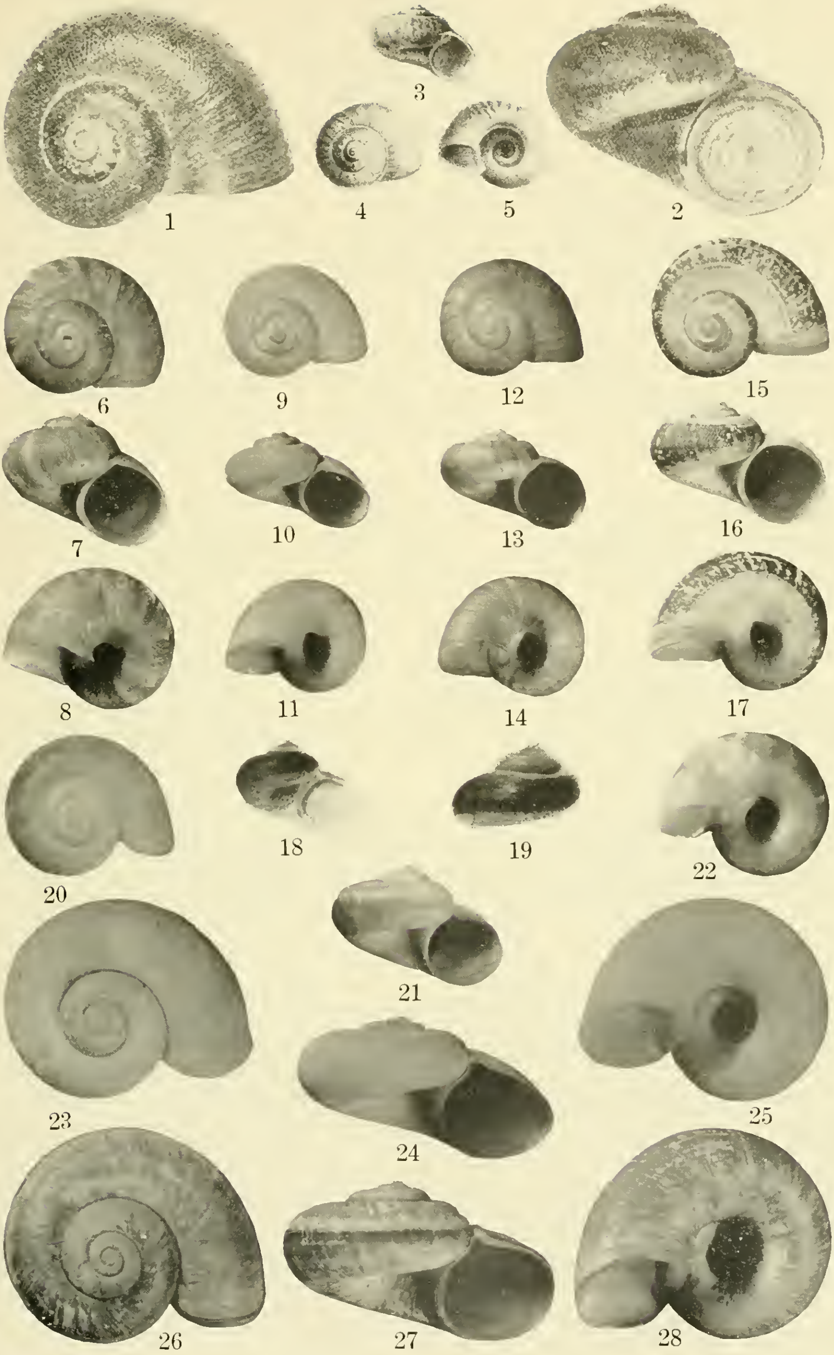
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 288.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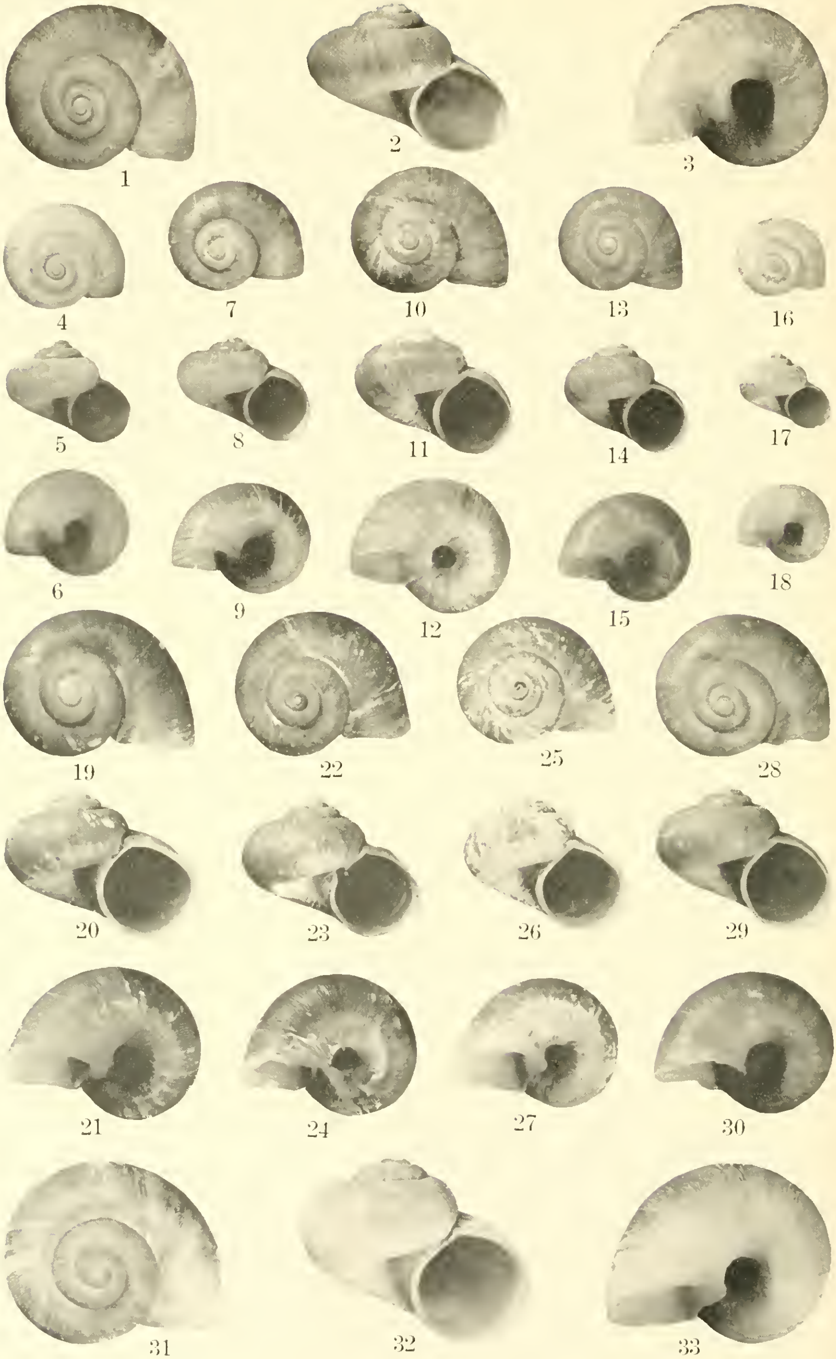
Cyclophorid Mollusks of America.

For explanation of plate see page 288.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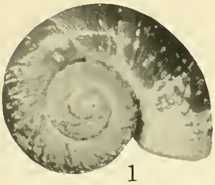
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 289.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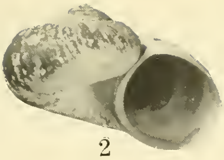
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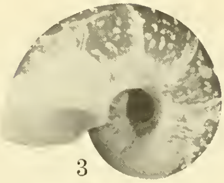
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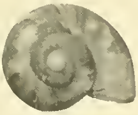
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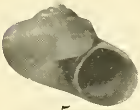
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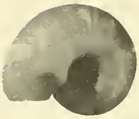
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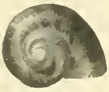
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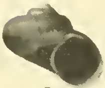
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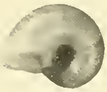
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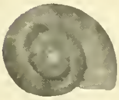
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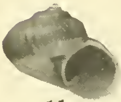
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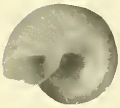
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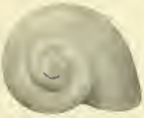
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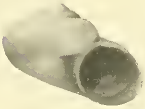
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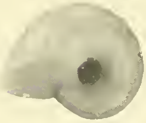
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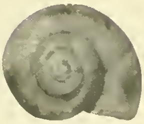
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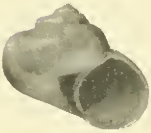
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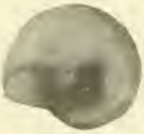
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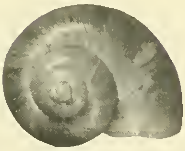
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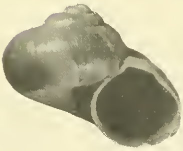
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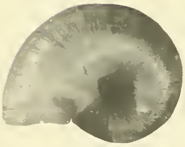
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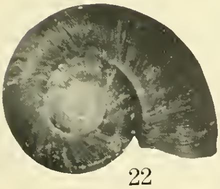
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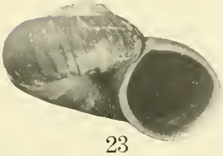
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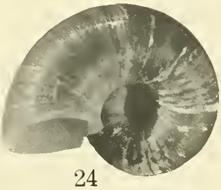
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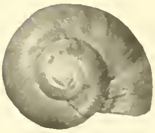
Cyclophorid Mollusks of America.

For explanation of plate see page 289.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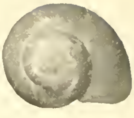
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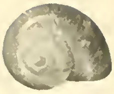
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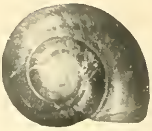
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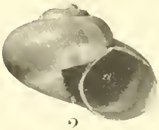
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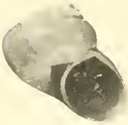
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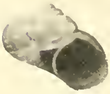
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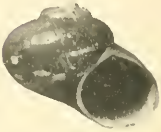
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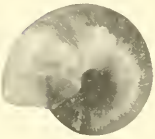
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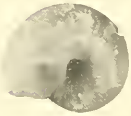
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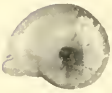
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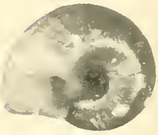
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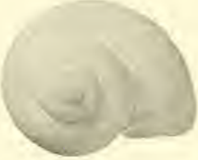
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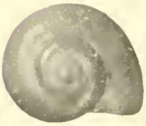
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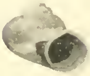
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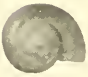
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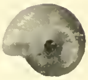
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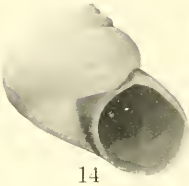
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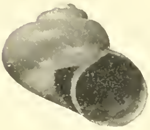
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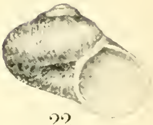
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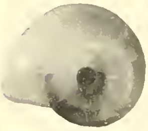
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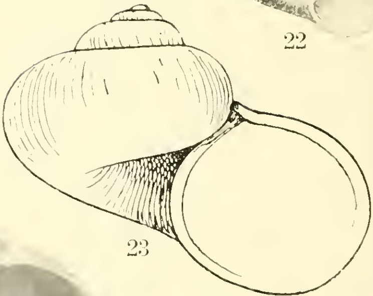
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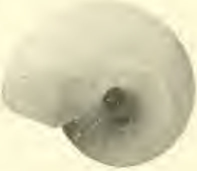
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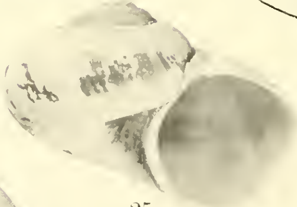
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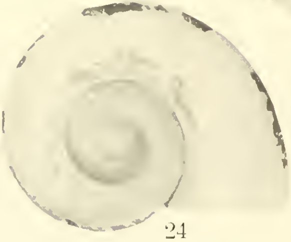
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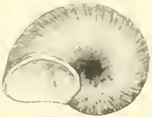
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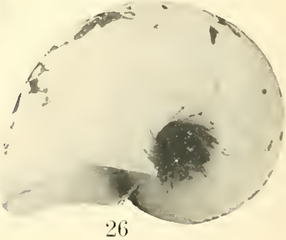
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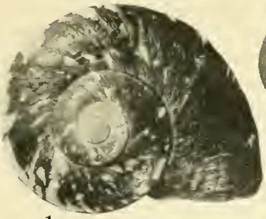
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 289.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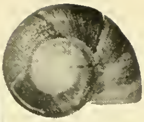
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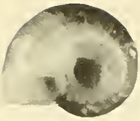
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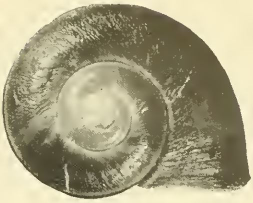
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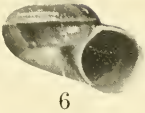
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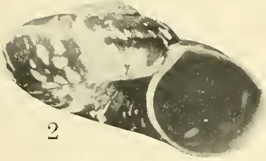
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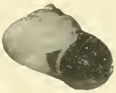
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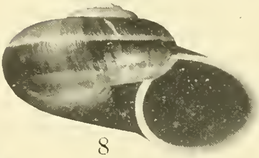
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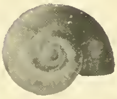
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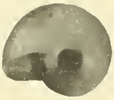
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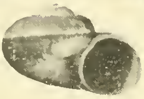
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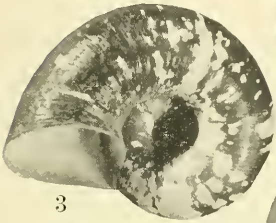
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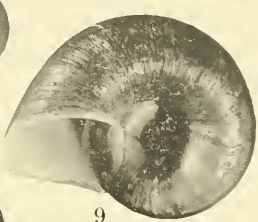
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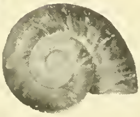
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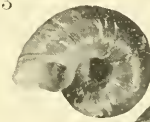
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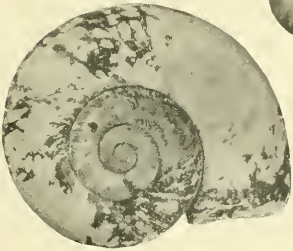
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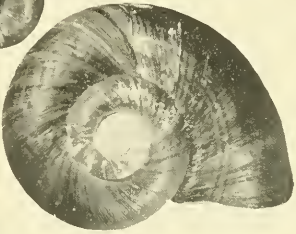
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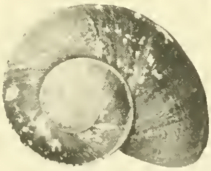
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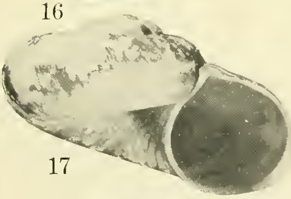
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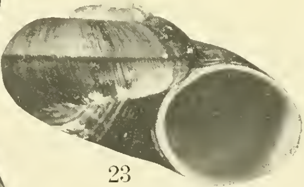
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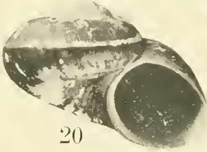
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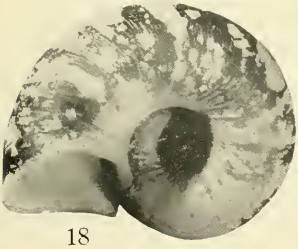
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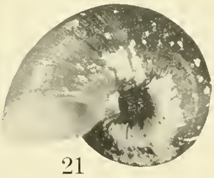
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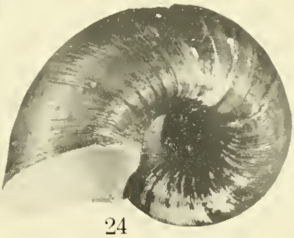
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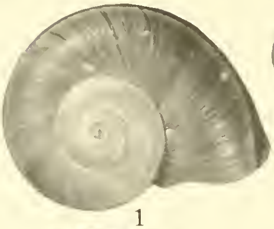
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 289.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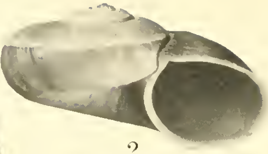
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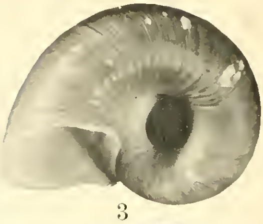
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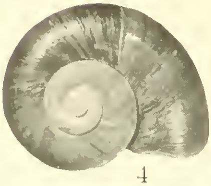
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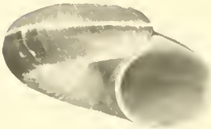
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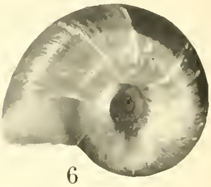
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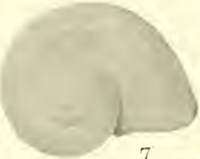
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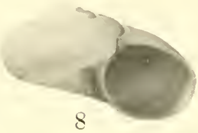
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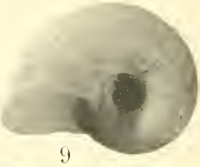
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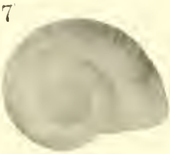
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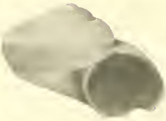
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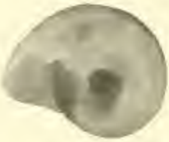
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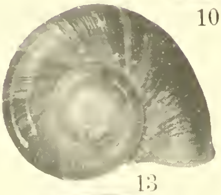
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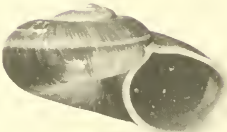
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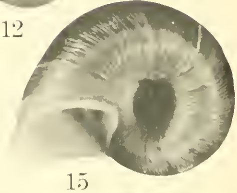
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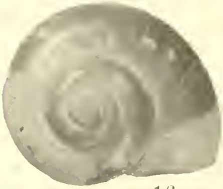
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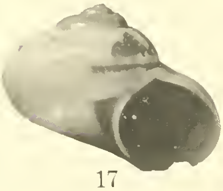
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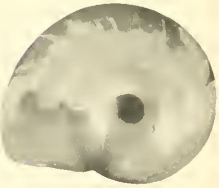
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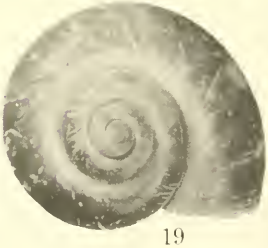
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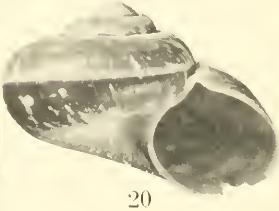
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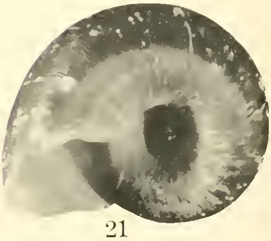
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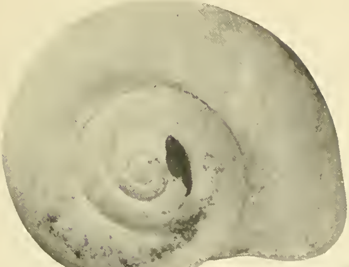
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGES 289, 290.



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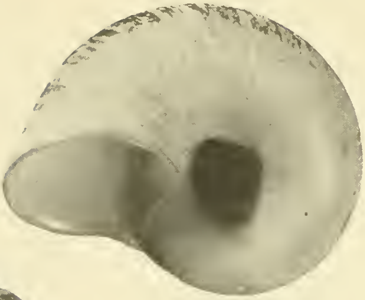

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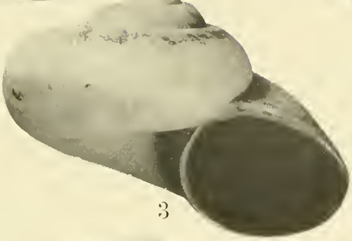

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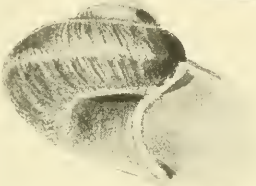

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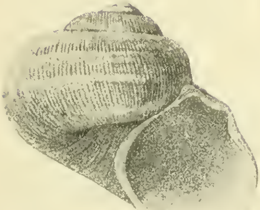

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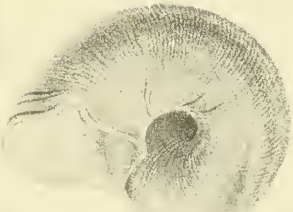

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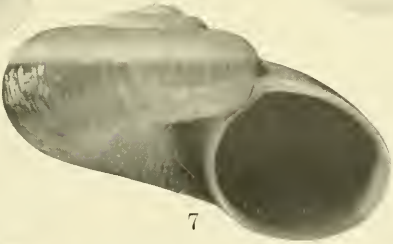

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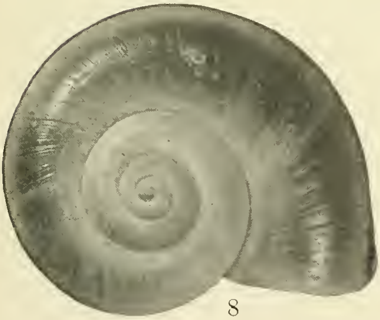

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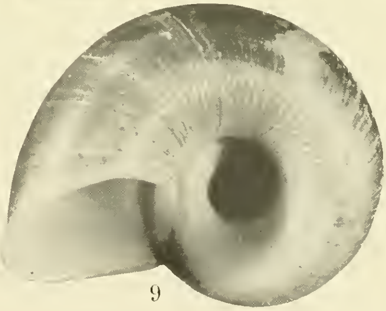

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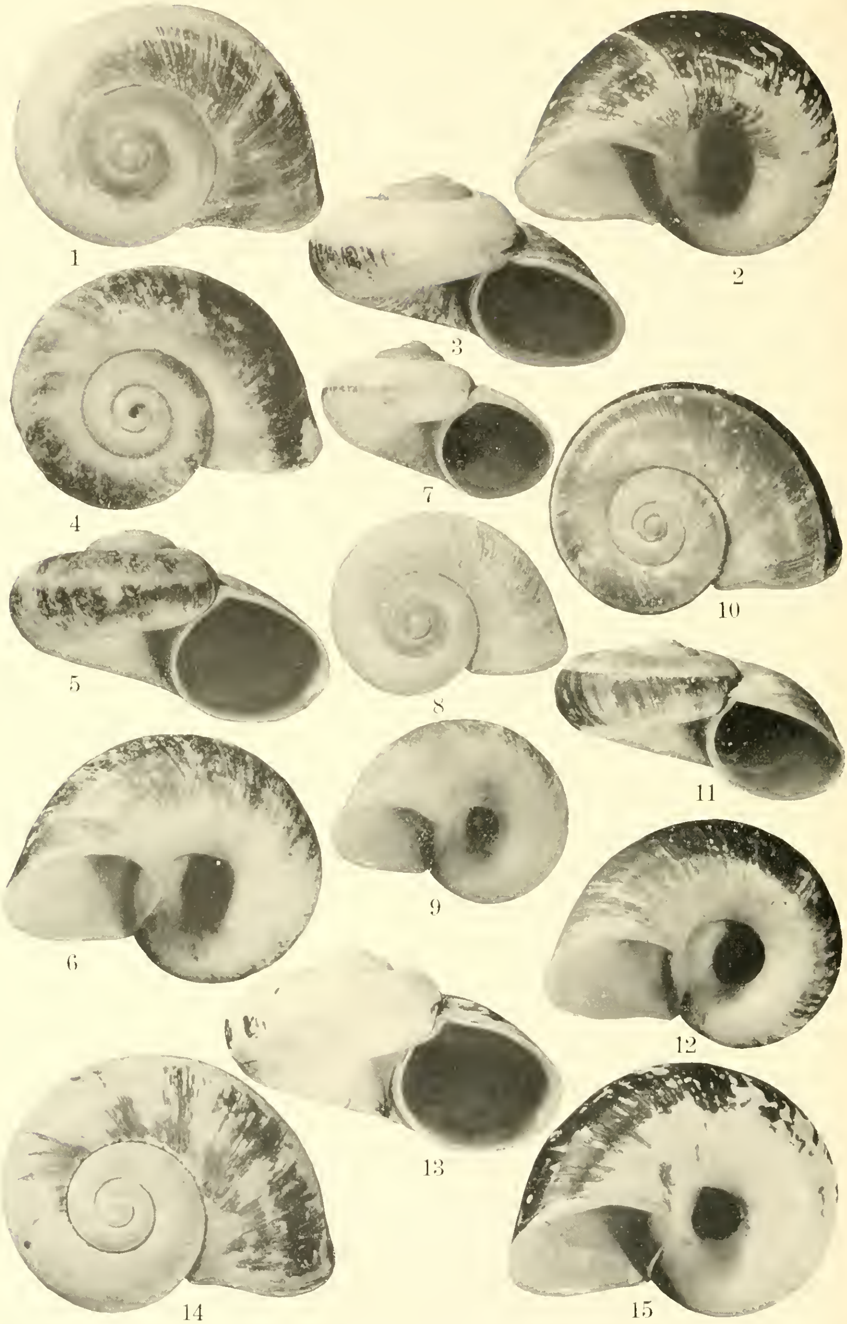
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 290.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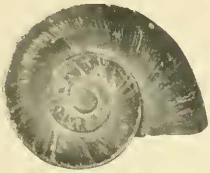
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 290.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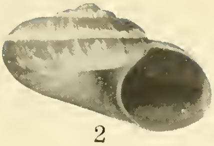
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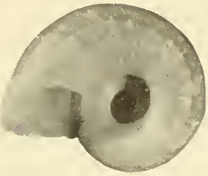
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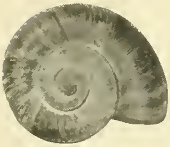
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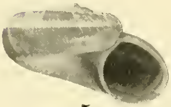
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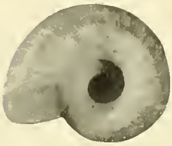
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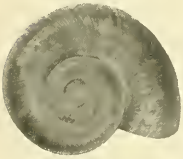
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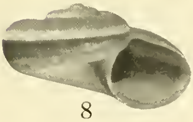
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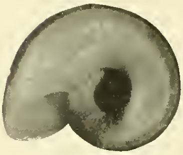
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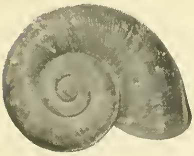
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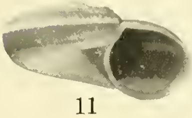
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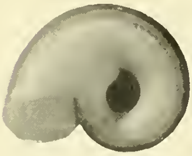
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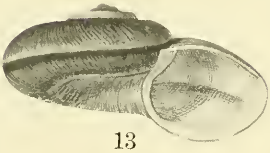
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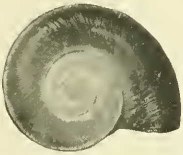
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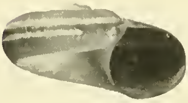
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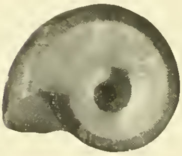
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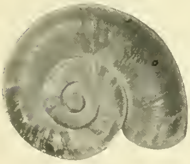
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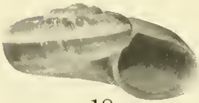
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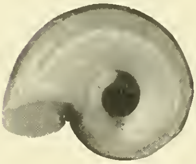
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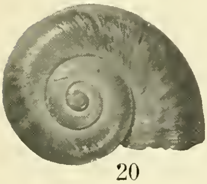
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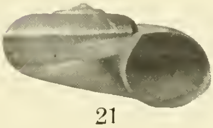
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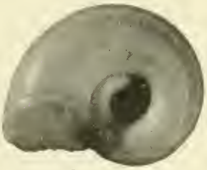
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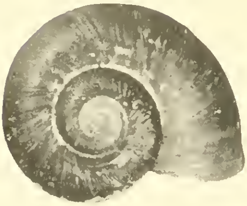
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 290.



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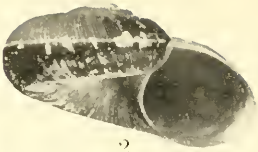

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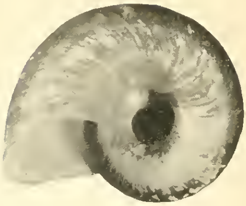

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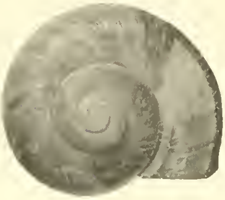

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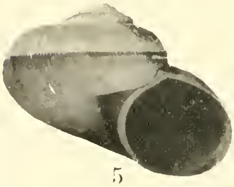

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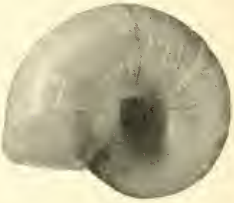

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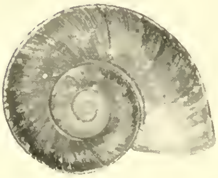

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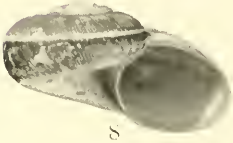

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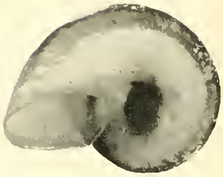

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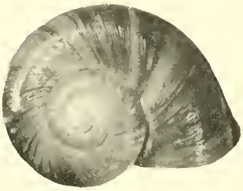

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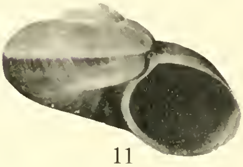

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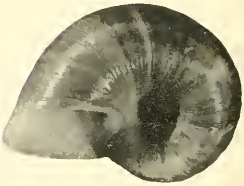

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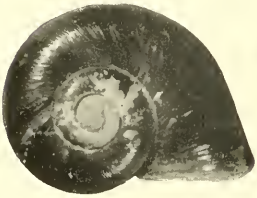

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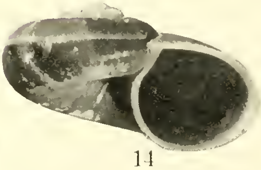

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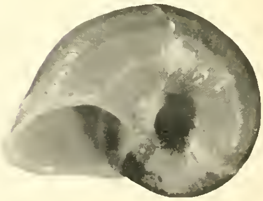

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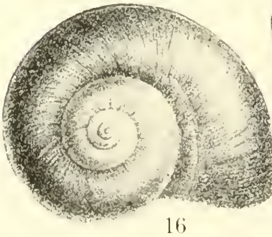

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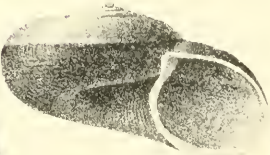

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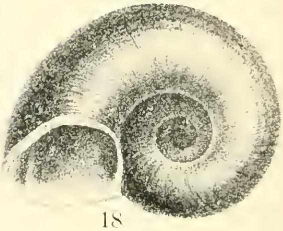

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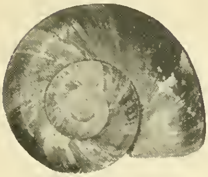
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 290.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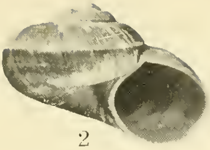
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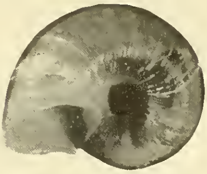
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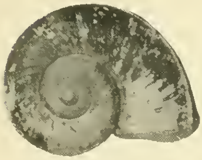
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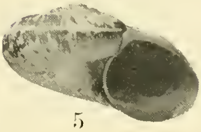
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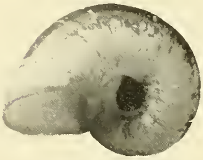
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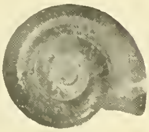
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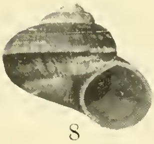
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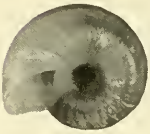
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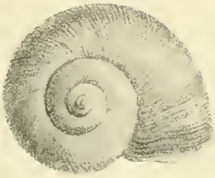
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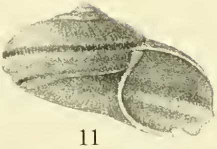
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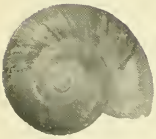
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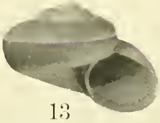
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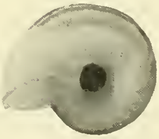
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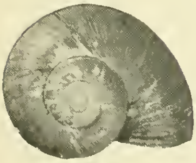
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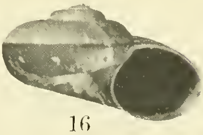
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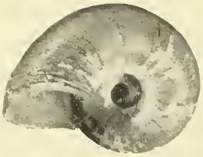
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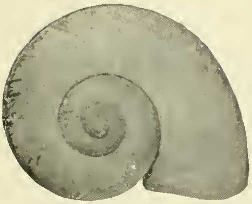
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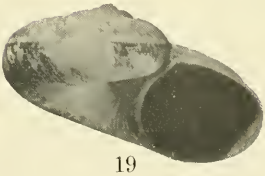
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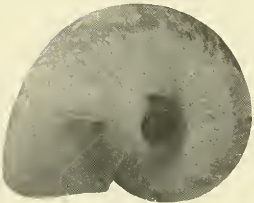
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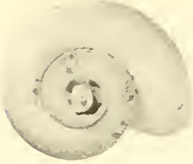
CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 290.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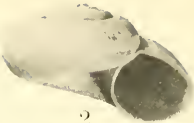
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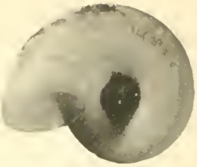
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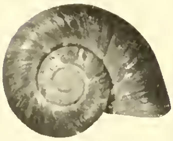
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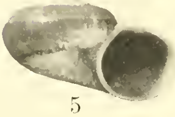
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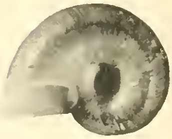
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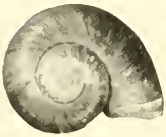
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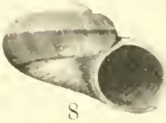
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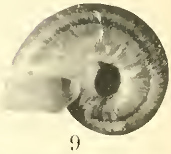
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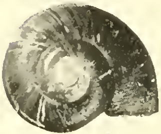
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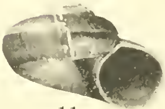
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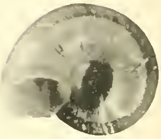
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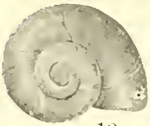
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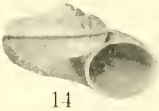
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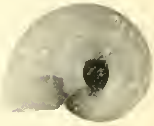
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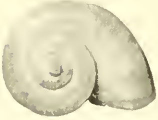
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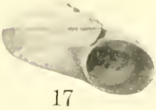
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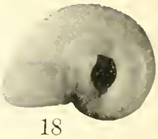
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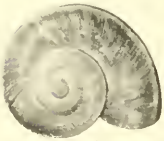
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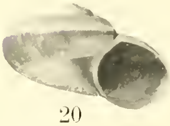
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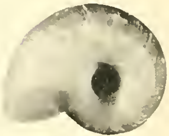
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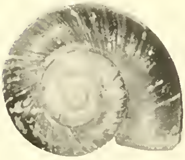
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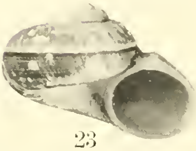
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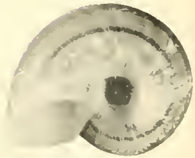
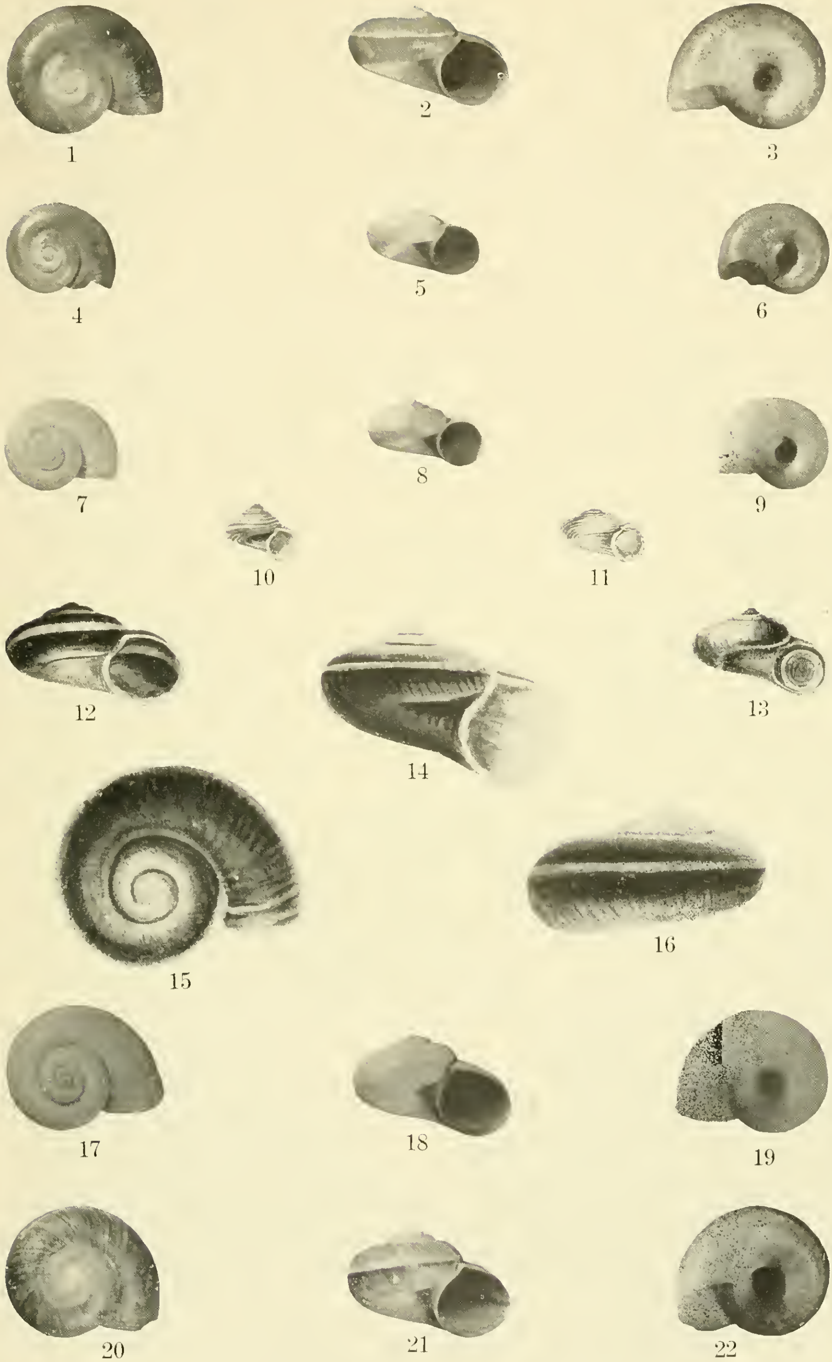

24

Cyclophorid Mollusks of America.

FOR EXPLANATION OF PLATE SEE PAGE 230.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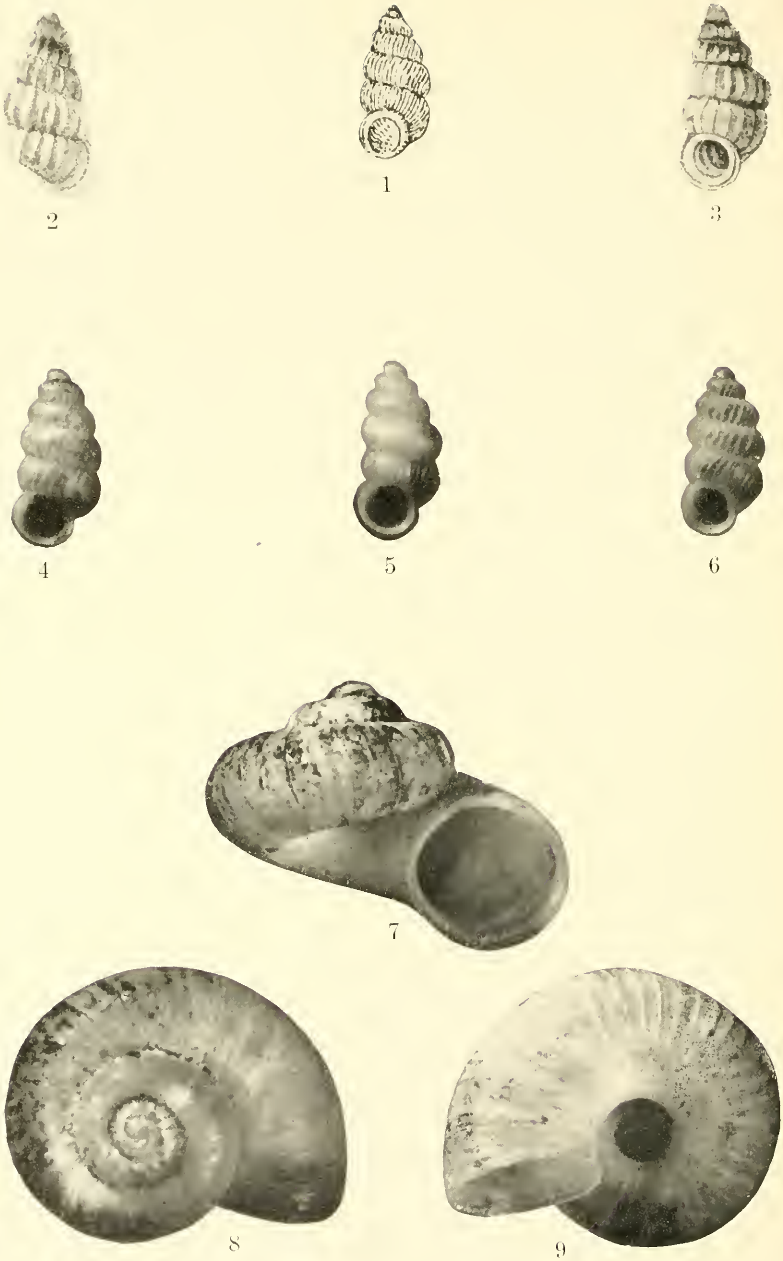
22

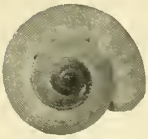
Cyclophorid Mollusks of America.

FOR EXPLANATION OF PLATE SEE PAGE 291.



Cyclophorid Mollusks of America.

FOR EXPLANATION OF PLATE SEE PAGE 291.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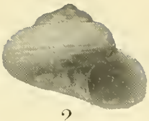
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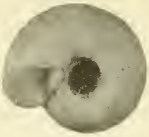
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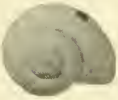
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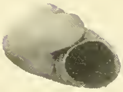
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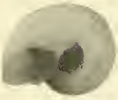
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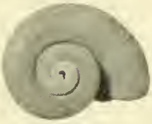
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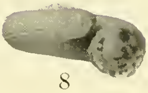
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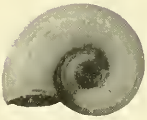
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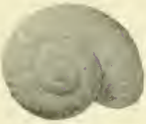
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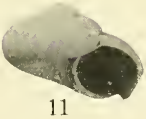
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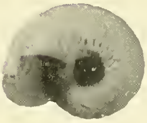
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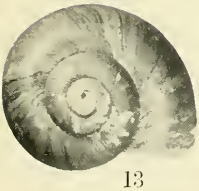
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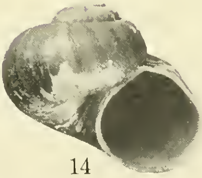
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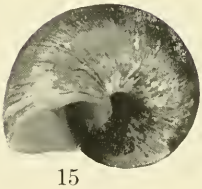
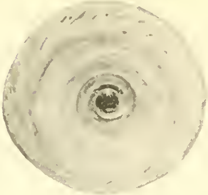

15

Cyclophorid Mollusks of America.

FOR EXPLANATION OF PLATE SEE PAGE 291.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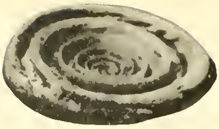
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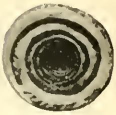
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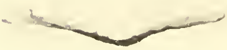
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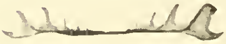
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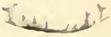
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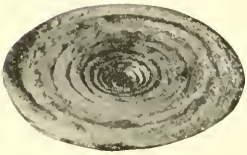
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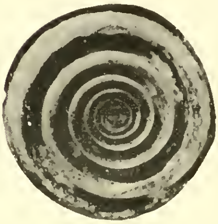
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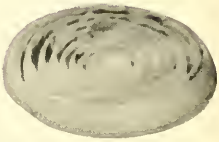
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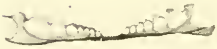
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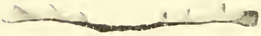
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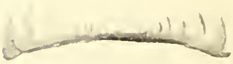
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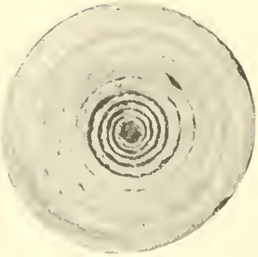
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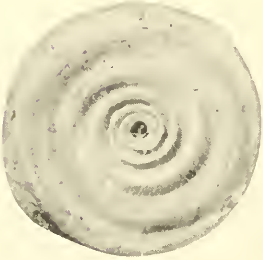
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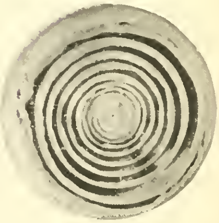
13

CYCLOPHORID MOLLUSKS OF AMERICA.

FOR EXPLANATION OF PLATE SEE PAGE 291.

INDEX

(Principal references are given in **boldface** type.)

- abbotti, Crocidopoma, 62, **67**, 285.
- acutiliratus, Amphicyclotulus, 54, **56**, 285.
  - Cyclophorus, 56, 141.
- adamsi, Ptychocochlis, 83, **94**, 95, 286.
- Adelopoma, 51, **148**.
  - bakeri, 148, **149**, 282, 291.
  - costaricense, 52, **150**, 280, 291.
  - occidentale, **52**, 148, 149, **150**, 151, 282, 291.
  - stolli, **149**, 281, 291.
  - tucma, **148**, 279, 291.
- affine, Aperostoma 204, **210**, 281, 289.
- affinis, Cyclotus, 210.
  - Neocyclotus, 210.
  - Poteria, 210.
- agassizi, Aperostoma, 223, **254**, 256, 279, 290.
- allantayum, Aperostoma, 221, **230**, 282, 289.
- alutaceum, Cyclostoma, 22.
  - Farcimen, 4, 15, **21**, **22**, 23, 24, 283.
- amazonense, Aperostoma, 222, **243**, 279, 290.
- ambiguum, Aperostoma, 203, 205, **211**, 281, 289.
- ambiguus, Cyclotus, 211.
  - Neocyclotus, 211.
  - Poteria, 211.
- amethystinus, Amphicyclotulus, **60**, 285.
  - Cyclotus, 60.
- Amphicyclotinae, 43, **52**, 142, 151.
- Amphicyclotulus, 52, **54**, 57, 60, 62.
  - acutiliratus, 54, **56**, 285.
  - amethystinus, **60**, 285.
  - beauianus, 60, **61**, 285.
  - dominicensis, 54, **57**, 285.
  - guadeloupensis, 54, **55**, 58, 60, 285.
  - liratus, 54, **58**, 60, 285.
  - mineri, 54, **55**, 58, 60, 285.
  - perplexus, 54, **59**, 285.
  - portoricensis, 54, **59**, 285.
  - rufescens, 54, **56**, 57, 285.
  - schrammi, 54, **57**, 58, 285.
- Amphicyclotus, 151, **183**.
  - boucardi, 183, **184**, 281, 288.
  - bourcieri, 163.
  - cayennensis, 276.
  - chanchopoyasensis, 162.
  - cooperi, 180.
  - cousini, 166.
  - crosseanus, 156.
  - cumingii, 167.
  - delphinulus, 158.
- Amphicyclotus esmeraldensis, 160.
  - gayi, 278.
  - goldfussi, **184**, 281.
  - guayaquilensis, 161.
  - haematomma, 155.
  - hidalgoi, 167.
  - lutescens, 181.
  - maleri, 184, **185**, 220, 281, 288.
  - nigrofasciatus, 164.
  - olssoni, 178.
  - orbignyi, 168.
  - ponderosus, 182.
  - psilomitus, 274.
  - rosenbergi, 160.
  - texturatus, 184, **186**, 281, 288.
  - underwoodi, 176.
  - vesconesi, 156.
- anafense, Farcimen, 27, **28**, 284.
- angasianum, Aperostoma, 177.
- angulatus, Cyclotus, 228.
- antillarum, Cyclostoma, 49.
  - Megalomastoma, **49**, 50, 284.
- antoni, Lagocyclus, **154**, 156, 280, 287.
- antonii, Cyclophorus, 154.
- Aperostoma, 62, **124**, 186, 187, **221**, 277.
  - affine, 204, **210**, 281, 289.
  - agassizi, 223, **254**, 256, 279, 290.
  - allantayum, 221, **230**, 282, 289.
  - amazonense, 222, **243**, 279, 290.
  - ambiguum, 203, 205, **211**, 281, 289.
  - angasianum, 177.
  - aulari, 195, 196, **199**, 200, 282, 288.
  - aureum, 204, 208, **209**, 281, 289.
  - bairdianum, 125, 126, **127** 287.
  - balsasense, 223, **265**, 266, 282, 291.
  - bartletti, 157.
  - bejumense, 268, 269, **270**, 272, 282, 289.
  - belli, **268**, 269, 279, 289.
  - berendti, 205, 211, **212**, 281, 289.
  - bisinuatum, 222, **235**, 280, 290.
  - blanchetianum, 187, 221, 222, **244**, 246, 247, 279, 290.
  - bogotense, 221, **226**, 227, 279, 289.
  - boliviense, 223, **260**, 261, 279, 290.
  - brujense, 222, **241**, 281, 290.
  - burringtoni, 196, **202**, 282, 289.
  - carabobense, 196, **201**, 282, 289.
  - cardozi, 221, 223, **266**, 282, 291.
  - carmioli, 221, **233**, 234, 280, 290.
  - castaneum, 222, 251, **252**, 282, 290.
  - caucaense, 223, **258**, 259, 280, 290.
  - chrysacme, 203, **219**, 281, 289.
  - cingulatum, 221, **228**, 229, 280, 289.

Aperostoma colombiense, 223, 258, 280, 290.
confusum, 221, 222, 237, 280, 281, 290.
connivens, 275.
cookei, 205, 215, 279, 281, 289.
cooperi, 180.
corpulentum, 203, 217, 218, 279, 289.
corrugatum, 105.
costaricense, 221, 234, 280, 290.
cumingi, 221, 224, 279, 289.
cumingii, 167.
currani, 223, 261, 279, 290.
deburghaeanum, 129, 130, 287.
depressum, 222, 247, 282, 290.
duffianum, 276.
dunkeri, 221, 230, 233, 280, 289.
dunoonense, 269, 273, 279, 289.
dyeri, 204, 205, 281, 289.
dysoni, 203, 204, 207, 209, 217, 281, 289.
ecuadorense, 222, 248, 250, 251, 280, 290.
exiguum, 221, 234, 280, 289.
fasciatum, 223, 256, 257, 282, 290.
filoliratum, 221, 267, 280, 291.
fischeri, 222, 239, 280, 290.
fossile, 125, 131, 287.
fultoni, 222, 242, 279, 290.
giganteum, 221, 222, 237, 238, 239, 277, 281, 290.
glaucostomum, 196, 199, 282, 288.
goldfussi, 184.
granulatum, 196, 280, 288.
grenadense, 133, 134, 135, 287.
haughti, 268, 269, 279, 289.
hedui, 187, 191, 279, 288.
hinkleyi, 203, 204, 206, 207, 281, 289.
hitomi, 187, 194, 280, 288.
humile, 129, 287.
inca, 221, 267, 279, 291.
incomptum 187, 192, 282, 288.
inconspicuum, 221, 227, 282, 289.
irregulare, 222, 236, 280, 290.
jamaicense. 105.
kobelti, 187, 190, 279, 288.
kugleri, 196, 201, 282, 289.
lacteofluviale, 98.
laxatum, 222, 244, 280, 290.
leai, 221, 222, 246, 282, 290.
limellum, 196, 197, 199, 201, 279, 288.
lutescens, 181.
major, 269, 270, 279, 289.
malleatum, 187, 188, 189, 190, 191, 282, 288.
manabense, 222, 239, 280, 290.
masvense, 223, 254, 280, 290.
mcsweeni, 132, 134, 135, 287.
merrilli, 223, 262, 263, 264, 279, 290.
mexicanum, 173.
montezumi, 151, 152.
moricandi, 219, 279, 291.
nanum, 223, 262, 263, 282, 290.
nevadense, 233, 255, 282, 290.
nicaraguense, 205, 214, 216, 281, 289.
Aperostoma nirafe, 187, 193, 195, 279, 288.
olivaceum, 222, 251, 252, 280, 290.
paezense, 221, 225, 279, 289.
paezicolum, 221, 232, 280, 290.
pailaense, 221, 231, 280, 289.
palenquense, 183.
panamense, 196, 197, 281, 288.
pazi, 217, 223, 257, 280, 290.
peilei, 196, 200, 279, 288.
perdistinctum, 276.
perezi, 223, 259, 280, 290.
pergrandis, 187, 188, 190, 279, 288.
peruense, 222, 245, 247, 282, 290.
peruvianum, 223, 252, 282, 290.
pichinchense, 187, 191, 280, 288.
pittieri, 222, 236, 280.
pizarroi, 187, 193, 194, 195, 282, 288.
popayanum, 223, 264, 266, 280, 291.
portobellense, 222, 242, 281, 290.
pretiosum, 126, 127, 287.
princeps, 175.
pulchellum, 223, 263, 279, 290.
pygmaeum, 269, 272, 282, 289.
quitense, 222, 250, 280, 290.
redfieldi, 223, 261, 279, 290.
ruatanense, 204, 207, 281, 289.
ruber, 125, 126, 127, 128, 287.
rudisplanusque, 125, 131, 287.
rugatum, 133, 286.
salengoense, 223, 253, 280, 290.
salleanum, 170.
sallei, 205, 213, 281, 289.
sanctaemarthae, 203, 217, 218, 279, 289.
santaguitense, 289.
scabratum, 125, 129, 287.
seminudum, 109, 125, 128, 129, 130, 131, 287, 291.
simile, 221, 227, 280, 289.
smithi, 203, 204, 216, 217, 279, 289.
stirlingi, 187, 195, 280, 288.
stramineum, 132, 195, 196, 198, 282, 288.
subcingulatum, 222, 249, 251, 280, 290.
sumichrasti, 204, 209, 211, 281, 289.
translucidum, 136, 179, 268, 269, 272, 279, 289.
trinitense, 136, 268, 269, 271, 282, 287, 289.
tryonianum, 116.
umbilicatum, 221, 224, 225, 226, 279, 289.
utriaense, 222, 240, 241, 280, 290.
valerioi, 205, 213, 215, 280, 289.
venzuelense, 222, 247 248, 282, 290.
veracochanum, 221, 229, 282, 289.
vincentinum, 133, 286.
walkeri, 174.
wetmorei, 203, 279, 291.
Aperostominae, 3, 38, 43, 62, 142, 186.
apertum, Cyclostoma, 26.
Farcimen 5, 26.
Megalomastoma, 26, 27.
arangoi, Farcimen, 36, 284.
asperula, Cyclopilsbrya, 71, 78, 285.

asperulum, Cyclostoma, 78.
asperulus, Cyclotus, 78.
  Neocyclotus, 78.
atratensis. Calacyclotus 178, **179**, 279, 288.
aulari, Aperostoma, 195, 196, 199, 200, 282, 288.
  Poteria, 199.
aureum, Aperostoma, 204, 208, **209**, 281, 289.
auriculatum, Cyclostoma, 16, 25.
  Farcimen, 24, 25, 26, 284.
Austrocyclotus, 124, **132**, 187, 195, 197, 202.
  aulari, 199.
  burringtoni, 202.
  carabobense, 201.
  glaucostomum, 199.
  granulatum, 196.
  grenadense, 134.
  kugleri, 201.
  limellum, 197.
  mcsweeni, 135.
  panamense, 197.
  peilei, 200.
  rugatum, 133.
  stramineum, 198.
  vincentinum, 133.
avus, Cyrtotoma, **169**, 170, 281, 288.
bairdianum, Aperostoma, 125, 126, **127**, 287.
bairdianus, Cyclotus, 127.
bakeri, Adelopoma, 148, **149**, 282, 291.
  Incerticyclus, **137**, 138, 139, 287.
  Neocyclotus, 137.
balnearis, Poteria, 116, **123**, 286.
balneorum, Farcimen, 31, **32**, 284.
balsasense, Aperostoma, 223, **265**, 266, 282, 291.
Barbacyclus, 151, **175**.
  boucardi, 175, **177**, 280, 288.
  princeps, **175**, 280, 288.
  underwoodi, 175, **176**, 178, 280, 288.
bartletti, Aperostoma, 157.
  Cyclotus, 157.
  Lagocyclus, 154, **157**, 282, 287.
  Neocyclotus, 157.
  Poteria, 157.
bayamense, Farcimen, 5, **6**, 283.
beauiana, Cyclostoma, 60, 61.
beauianus, Amphicyclotulus, 60, **61**, 285.
bejumense, Aperostoma 268, 269, **270**, 272, 282, 289.
bejumensis, Poteria 270.
belli, Aperostoma **268**, 269, 279, 289.
  Neocyclotus, 201, 268.
berendti, Asperostoma. 205, 211, **212**, 281, 289.
  Cyclotus, 212.
  Neocyclotus, 212.
  Poteria, 212.
beswicki, Cyclopilsbrya, 71, **79**.
  Cyclotus, 79.
  Neocyclotus, 79.
biayaense, Farcimen, 12, **13**, 14, 283.
bicincta, Buckleyia, 151, **152**, 280, 287.
bicolor, Cyclostoma, 25.
  Farcimen, 24, **25**, 284.
bifasciata, Buckleya, 153.
  Buckleyia, 151, **153**, 279, 287.
  Cyclophorus, 153.
bisinuatum, Aperostoma, 222, **235**, 280, 290.
bisinuatus, Cyclotus, 235.
  Neocyclotus, 235.
bituberculatum, Cyclostoma, 15.
  Farcimen, 13, **14**, 15, 16, 283.
blanchetianum, Aperostoma, 187, 221, 222, **244**, 246, 247, 279, 290.
  Cyclostoma, 124, 244, 267.
  Poteria, 245.
bogotense, Aperostoma, 221, **226**, 227, 279, 289.
  Cyclostoma, 226.
bogotensis, Cyclotus, 226.
  Neocyclotus, 226.
  Poteria, 226.
boliviense, Aperostoma, 223, **260**, 261, 279, 290.
bondi, Cyclojamaicia, 68, 69, 70, 285.
  Poteria, 68.
boucardi, Amphicyclotus, 183, 184, 281, 288.
  Barbacyclus, 175, **177**, 280, 288.
  Cyclophorus, 184.
  Cyclostoma, 184.
  Cyclotus, 175, 177.
  Neocyclotus, 177.
bourcieri, Amphicyclotus, 163.
  Calaperostoma, 159, **163**, 164, 280, 287.
  Cyclophorus, 163.
  Cyclostoma, 163.
bowdenensis, Incerticyclus, **138**, 139, 291.
brasiliense, Cyclostoma, 277.
braziliensis, Incerticyclus, **277**, 279, 291.
brujense, Aperostoma, 222, **241**, 281, 290.
brunnea, Megalomastoma, 48, 49.
brunneum, Megalomastoma, 48, **49**, 284, 285.
Buckleya, 151.
  bifasciata, 153.
  martinezi, 152.
Buckleyia, **151**.
  bicincta, 151, **152**, 280, 287.
  bifasciata, 151, **153**, 279, 287.
  martinezi, 151, **152**, 154, 280, 287.
burringtoni, Aperostoma, 196, **202**, 282, 289.
  Poteria, **107**, 286.
Calacyclotus, 151, **178**.
  atratensis, 178, **179**, 279, 288.
  olssoni, 178, 179, 279, 281, 288.
Calaperostoma, 151, **159**.
  bourcieri, 159, **163**, 164, 280, 287.
  chanchapoyasense, 159, **162**, 164, 282, 287.
  cousini, 159, **166**, 167, 280, 288.
  cumingi, 159, **167**, 169, 279, 288.
  esmeraldense, 159, **160**, 161, 280, 287.
  guayaquilense, 159, **161**, 280, 287.
  hidalgoi, 159, 166, **167**, 279, 287.

Calaperostoma leai, 159, **165**, 279, 288.
  nigrofasciatum, 159, **164**, 166, 280, 288.
  orbignyi, 159, **168**, 279.
  pittieri, 159, **164**, 281, 287.
  purum, 159, **162**, 280, 287.
  rosenbergi, 159, **160**, 280, 287.
camagueyanum, Farcimen, **10**, **11**, 283.
campeachyi, Poteria, 104.
  Ptychocochlis, 84, **103**, 104, 286.
carabobense, Aperostoma, 196, **201**, 282, 289.
cardozi, Aperostoma, 221, 223, **266**, 282, 291.
  Poteria, 266.
caribaea, Cyclopilsbrya, 71, **77**, 286.
  Poteria, 77.
carmioli, Aperostoma, 221, **233**, 234, 280, 290.
castaneum, Aperostoma, 222, 251, **252**, 282, 290.
casuelense, Crocidopoma, 62, **65**, 291.
catalinense, Farcimen, **36**, 284.
caucaense, Aperostoma, 223, 258, 259, 280, 290.
caucaensis, Neocyclotus, 258.
  Poteria, 258.
cayennense, Cyclostoma, 276.
cayennensis, Amphicyclotus, 276.
  Cyclophorus, 276.
  Incerticyclus, **276**, 281.
caymanensis, Cyclopilsbrya, **80**, 285.
  Poteria, 80.
Cerion truncatum, 45.
chanchapoyasense, Calaperostoma, 159, **162**, **164**, 282, 287.
chanchapoyasensis, Amphicyclotus, 162.
chittyi, Poteria, 116, 121, 286.
chrysacme, Aperostoma, 203, **219**, 281, 289.
  Neocyclotus, 219.
cinereus, Cyclophorus, 141.
  Incerticyclus, **141**, 287.
cingulatum, Aperostoma 221, **228**, 229, 280, 289.
  Cyclostoma, 228.
  Poteria, 228.
cingulatus, Cyclotus, 228.
  Neocyclotus, 228, 253.
clappi, Ptychocochlis, 82, 83, **91**, 286.
clenchi, Farcimen, **24**, **25**, 284.
collare, Farcimen, **17**, **18**, 19, 283.
colombiense, Aperostoma, 223, **258**, 280, 290.
colombiensis, Neocyclotus, 258.
  Poteria, 258.
complanatum, Megalomastoma, 38.
confusum, Aperostoma, 221, 222, **237**, 280, 281, 290.
  Poteria, 237.
connivens, Aperostoma, 275.
  Cyclotus, 275.
  Incerticyclus, **275**, 282, 291.
  Neocyclotus, 275.
constrictus, Tomocyclus, 143, **145**, 281, 287.
cookei, Aperostoma 205, **215**, 279, 281, 289.
cooperi, Amphicyclotus, 180.
  Aperostoma, 180.
  Cyclotus, 180.
  Cyrtotoma, 180.
  Mexcyclotus, **180**, 181, 281, 288.
copanense, Cyclostoma, 147.
copanensis, Tomocyclus, 143, **147**, 281, 287.
corpulentum, Aperostoma, 203, **217**, **218**, 279, 289.
corpulentus, Cyclotus, 217.
  Neocyclotus, 217.
  Poteria, 217.
corrugata, Ptychocochlis, 82, 83, **93**, **95**, 286.
corrugatior, Cyclotus, 84.
  Neocyclotus, 84.
  Ptychocochlis, 83, **84**, **85**, **86**, 286.
corrugatissima, Poteria, 107 **110**, **112**, 114, 286.
corrugatissimus, Cyclotus, **110**.
  Neocyclotus, 110.
corrugatum, Aperostoma, 105.
  Cyclostoma, 77, 82, 93, 105, 106, **119**.
corrugatus, Cyclotus, 115, 119.
costaricense, Adelopoma, 52, **150**, 280, 291.
  Aperostoma, 221, **234**, 289, 290.
costaricensis, Cyclotus, 234.
cousini, Amphicyclotus, 166.
  Calaperostoma 159, **166**, **167**, 280, 288.
  Cyclophorus, 166.
crassa, Poteria, 107, **113**, 286.
crassum, Cyclostoma, 113.
  Farcimen, **15**, **16**, 283.
crassus, Cyclotus, 113, 115.
  Neocyclotus, 113.
crocea, Cyclostoma, 45.
  Helix, 44, 45.
croceum, Farcimen, 44, **45**, **46**, 285.
Crocidopoma, **39**, **53**, **62**.
  abbotti, 62, **67**, 285.
  casuelense, 62, **65**, 291.
  elevatum, 62, **63**, **64**, 285.
  floccosum, 39, 62, **64**, **65**, 285.
  gundlachi, 39, **41**, **42**, 284.
  ignotum, **41**, **42**, 284.
  milleri, 62, **66**, 285.
  orcutti, 62, **66**, 285.
  perdistinctum, 39, **40**, 284.
  toroense, **40**, 284.
  vortex, 62, **63**, 65, 285.
  wrighti, **41**, **42**, 284.
crosseanus, Amphicyclotus, 156.
  Cyclophorus, 156.
  Lagocyclus, 154, 155, **156**, 280, 287.
cumingi, Aperostoma, 221, **224**, 279, 289.
  Calaperostoma, 159, **167**, **169**, 279, 288.
  Cyclophorus, 158.
cumingii, Amphicyclotus, 167.
  Aperostoma, 167.
  Cyclophorus, 167.
currani, Aperostoma, 223, **261**, 279, 290.

curtum, Farcimen, 3, **44**, 46, 285.
    Megalomastoma, 44.
Cycladamsia, 124, **125**.
    bairdianum, 127.
    deburghaeanum, 130.
    fossile, 131.
    humile, 129.
    pretiosum, 127.
    ruber, 126.
    rudisplanusqùe, 131.
    scabratum, 129.
    seminudum, 130.
cycloata, Poteria, 109, **110**, 286.
cycloatus, Cyclotus, 110.
    Neocyclotus, 110.
Cyclobakeria, 106, **115**
    balnearis, 123.
    chittyi, 121.
    dentistigmata, 120.
    magister, 119.
    nana, 120.
    notatior, 122.
    novaespei, 117.
    taylori, 119.
    tryoniana, 116.
    welchi, 118.
    yallahsensis, 123.
Cycloblandia, 54, **60**.
    amethystinus, 60.
    beauianus, 61.
Cyclocaymania, 71, **79**.
    caymanensis, 80.
    fonticula, 81.
    laevitesta, 82.
Cyclocubana, **39**.
    gundlachi, 42.
    ignotum, 42.
    perdistinctum, 39.
    toroense, 40.
    wrighti, 42.
Cyclohaitia, **52**, 53.
    haitia, **53**, 285.
Cyclohidalgoa, 124, **136**, 187, 268.
    bejumense, 270.
    belli, 268.
    dunoonense, 273.
    haughti, 269.
    major, 270.
    pygmaeum, 272.
    translucidum, 272.
    trinitense, 136, 271.
Cyclojamaicia, 62, **67**.
    bondi, **68**, 69, 70, 285.
    suturalis, 68, **69**, 70, 285.
Cyclophoridae, **3**, 43, 137, 142.
Cyclophorus, 124.
    acutiliratus, 56, 141.
    antonii, 154.
    bifasciata, 153.
    boucardi, 184.
    bourcieri, 163.
    cayennensis, 276.
    cinereus, 141.
    cousini, 166.
    crosseanus, 156.
    cumingi, 158.
    cumingii, 167.
Cyclophorus delphinulus, 158.
    disjunctus, 219.
    dysoni, 207.
    esmeraldensis, 160.
    gayi, 278.
    goldfussi, 184.
    guayaquilensis, 161.
    haematomma, 155.
    hidalgoi, 167.
    liratus, 58, 141.
    lutescens, 180, 181.
    maleri, 185.
    martinezi, 152.
    mexicanus, 173.
    nigrofasciatus, 164.
    orbignyi, 168.
    ponderosus, 182.
    psilomitus, 274.
    rosenbergi, 160.
    salleanus, 170.
    texturatus, 186.
    underwoodi, 176.
    vasconesi, 156.
    vesconesi, 156, 160.
    volvulus, 124.
Cyclopilsbrya, 62, **71**.
    asperula, 71, **78**, 285.
    beswicki, 71, **79**.
    caribaea, 71, **77**, 286.
    caymanensis, **80**, 285.
    fonticula, 80, **81**, 285, 291.
    glenburniensis, 71, **73**, 75, 285.
    hendersoni, 71, **72**, 285.
    jugosa, 71, **76**, 285, 291.
    laevitesta, 80, **82**, 285.
    rufilabris, 71, **78**, 79, 285.
    rupisfontis, 71, **74**, 285.
    striosa, 71, **75**, 76, 285.
    westmorelandensis, 71, **72**, 295.
Cyclopoma, 219.
    disjunctum, 219.
Cyclopomops, 187, **219**, 278.
    moricandi, **219**.
Cyclostoma, 41.
    alutaceum, 22.
    antillarum, 49.
    apertum, 26.
    asperulum, 78.
    auriculatum, 16, 25.
    beauiana, 60, 61.
    bicolor, 25.
    bituberculatum, 15.
    blanchetianum, 124, 244, 267.
    bogotense, 226.
    boucardi, 184.
    bourcieri, 163.
    brasiliense, 277.
    cayennense, 276.
    cingulatum, 228.
    copanense, 147.
    corrugatum, 77, 82, 93, 105, 106, 119.
    crassum, 113.
    crocea, 45.
    cumingii, 167.

Cyclostoma disjunctum, 219.
distinctum, 275.
dubiosum, 70.
duffianum, 276.
dysoni, 203, 207.
flavidum, 45.
flavula, 45.
floccosum, 39, 62, 64.
gayi, 278.
giganteum, 124, 237, 238.
glaucostomum, 199.
grenadense, 134.
guatemalense, 144.
guayaquilense, 161.
idolum, 25.
inca, 267.
incomptum, 191, 192, 276.
inconspicuum, 227.
inornata, 61.
irregulare, 236.
jamaicense, 105, 106, 109, 112.
jugosum, 71, 76.
laxatum, 244.
lutescens, 181.
mani, 30.
martinicense, 140.
mexicanum, 124, 173.
moricandi, 220.
orbignyi, 46, 47.
pallescens, 111.
perpallidum, 139.
ponderosum, 182, 276.
popayana, 264.
prominula, 277.
psilomitum, 274.
purum, 162.
quitense, 250.
rufescens, 56.
schrammi, 57.
seminudum, 125, 126, **130**.
simulacrum, 146.
solenatum, 25.
stramineum, 198, 276.
striata, 165.
striatum, 165.
subrugosum, 105.
suturale, 68, 69.
texturatum, 186, 276.
tortum, 4, 26, 38.
translucidum, 272.
varians, 86, 92, 93, 127, 128.
ventricosa, 30.
verruculosum, 51.
volvulus, 124.
vortex, 63.
Cyclotus, 41.
affinis, 210.
ambiguus, 211.
amethystinus, 60.
angulatus, 228.
asperulus, 78.
bairdianus, 127.
bartletti, 157.
berendti, 212.
Cyclotus beswicki, 79.
bisinuatus, 235.
bogotensis, 226.
boucardi, 175, 177.
cingulatus, 228.
connivens, 275.
cooperi, 180.
corpulentus, 217.
corrugatior, 84.
corrugatissimus, 110.
corrugatus, 115, 119.
costaricensis, 234.
crassus, 113, 115.
cycloatus, 110.
deburghaeanus, 130.
dentistigmatus, 120.
duffianus, 277.
dunkeri, 230.
dysoni, 208.
filo-liratus, 267.
fischeri, 239.
floccosus, 64.
gemma, 87.
giganteus, 238.
glaucostoma, 200.
glaucostomus, 199.
granulatus, 196.
inca, 244, 267.
incomptus, 189, 191.
inutilis, 107, 115.
irregularis, 236.
jamaicense, 123.
jamaicensis, 115.
jugosus, 76.
quitensis, 250.
laxatus, 244.
lineatus, 105, 109.
magna, 101.
mexicanus, 173.
minor, 100, 213.
multilineatus, 212.
nodosus, 107, 114.
notatior, 122, 123.
notatus, 107, 114.
novae-spei, 115, 117.
novussaltus, 112.
pallescens, 111.
parva, 76, 77.
pazi, 257.
perdistinctus, 39, 40.
perezi, 259.
perpallidus, 139.
pittieri, 236.
popayanus, 264.
portlandensis, 93, 94.
portoricensis, 59.
pretiosus, 127.
ruber, 126.
rudis-planusque, 131.
rufilabris, 78.
rugatus, 133.
rupisfontis, 74.
stramineus, 198.
striosus, 75.

Cyclotus subrugosus, 105.
  translucidus, 271, 272.
  trinitensis, 136, 271.
  varians, 86.
  vortex, 63.
  westmorelandensis, 72.
  zigzag, 90.
Cyclovendreysia, 62, 69.
  dubiosa, 70, 285.
cylindraceum, Megalomastoma, 45.
Cylindropalaina, 148.
Cyrtotoma, 151, 169.
  avus, 169, 170, 281, 288.
  cooperi, 180.
  fischeri, 169, 170, 281, 288.
  goldmani, 169, 173, 174, 281, 288.
  ignotum, 169, 170, 281, 288.
  mexicanum, 169, 173, 174, 281, 288.
  palmeri, 169, 172, 281, 288.
  salleanum, 169, 170, 281, 288.
  walkeri, 169, 174, 281, 288.
deburghaeanum, Aperostoma, 129, 130, 287.
deburghaeanus, Cyclotus, 130.
delphinulus, Amphicyclotus, 158.
  Cyclophorus, 158.
  Filocyclus, 158, 282, 287.
dentistigmata, Poteria, 116, 120, 287, 291.
dentistigmatus, Cyclotus, 120.
  Neocyclotus, 120.
depressum, Aperostoma, 222, 247, 282, 290.
depressus, Neocyclotus, 247.
  Poteria, 247.
digitale, Farcimen, 22, 23, 283.
  Megalomastoma, 23.
Diplommatina occidentale, 52.
  occidentalis, 52
  stolli, 149.
Diplommatininae, 43, 51, 142, 148.
disjunctum, Cyclopoma, 219.
  Cyclostoma, 219.
disjunctus, Cyclophorus, 219.
distinctum, Cyclostoma, 275.
distinctus, Incerticyclus, 275, 291.
  Neocyclotus, 275.
domingoense, Farcimoides, 46, 47, 284.
dominicensis, Amphicyclotulus, 54, 57, 285.
dubiosa, Cyclovendreysia, 70, 285.
dubiosum, Cyclostoma, 70.
duffianum, Aperostoma, 276.
  Cyclostoma, 276.
duffianus, Cyclotus, 277.
  Incerticyclus, 276, 282.
  Neocyclotus, 277.
dunkeri, Aperostoma, 221, 230, 233, 280, 289.
  Cyclotus, 230.
  Neocyclotus, 230.
  Poteria, 230, 256.
dunoonense, Aperostoma, 269, 273, 279, 289.
dyeri, Aperstoma, 204, 205, 281, 289.
dysoni, Aperstoma, 203, 204, 207, 209, 217, 281, 289.
  Cyclophorus, 207.
  Cyclostoma, 203, 207.
  Cyclotus, 208.
  Neocyclotus, 208, 209.
  Platystoma, 208.
  Poteria, 208.
ecuadorense, Aperostoma, 222, 248, 250, 251, 280, 290.
elephantinum, Farcimen, 7, 9, 283.
elevatum, Crocidopoma, 62, 63, 64, 285.
esmeraldense, Calaperostoma, 159, 160, 161, 280, 287.
esmeraldensis, Amphicyclotus, 160.
  Cyclophorus, 160.
Eupalaina, 148.
exiguum, Aperostoma, 221, 234, 280, 289.
Farcimen, 1, 3, 4, 5, 34, 43, 45, 46.
  alutaceum, 4, 15, 21, 22, 23, 24, 283.
  anafense, 27, 28, 284.
  apertum, 5, 26.
  arangoi, 36, 284.
  auriculatum, 24, 25, 26, 284.
  balneorum, 31, 32, 284.
  bayamense, 5, 6, 283.
  biayaense, 12, 13, 14, 283.
  bicolor, 24, 25, 284.
  bituberculatum, 13, 14, 15, 16, 283.
  camagueyanum, 10, 11, 283.
  catalinense, 36, 284.
  clenchi, 24, 25, 284.
  collare, 17, 18, 19, 283.
  crassum, 15, 16, 283.
  croceum, 44, 45, 46, 285.
  curtum, 3, 44, 46, 285.
  digitale, 22, 23, 283.
  elephantinum, 7, 9, 283.
  flavulum, 45.
  florencianum, 11, 12, 283.
  giganteum, 15, 16, 283.
  guanense, 37, 284.
  guantanamense, 7, 10, 283.
  guitarti, 17, 19, 283.
  gundlachi, 27, 28, 284.
  gundlachiellum, 27, 28, 284.
  gutierrezi, 15, 16, 17, 283.
  hendersoni, 35, 36, 284.
  hjalmersoni, 44, 45, 285.
  holguinense, 7, 8, 283.
  itinerarium, 35, 284.
  lagunillense, 37, 38, 284.
  leonellum, 29, 284.
  leoni, 17, 19, 283.
  leoninum, 29, 284.
  magister, 17, 19, 283.
  magnificum, 22, 283.
  mani, 30, 284.
  martianum, 13, 14, 283.
  mayajiguense, 11, 12, 283.
  mayariense, 7, 8, 10, 283.
  mayense, 7, 10, 283.
  minor, 15, 16, 283.
  mirandum, 7, 9, 283.
  multistriatinum, 31, 32.

Farcimen najazaense, 13, 14, 283.
  obesum, 20, 21, 283.
  perconvexum, 7, 8, 283.
  poeyi, 17, 18, 19, 283.
  procer, 38, 284.
  pseudotortum, 5, 6, 7, 26, 283.
  rocai, 23 284.
  scopulorum, 4, 33, 284.
  seminudum, 17, 19, 283.
  semivestitum, 7, 8, 283.
  senectum, 24, 284.
  subobesum, 20, 21, 283.
  subventricosum, 31, 32, 284.
  superbum, 34, 35, 284.
  torrei, 20, 284.
  tortum, 4, 5, 26, 284.
  turquinoense, 5, 6, 283.
  ungula, 5, 7, 9, 10, 283.
  ventricosum, 30, 32, 284.
  vinalense, 32, 33, 284.
  wrighti, 12, 13, 283.
  yunquense, 6, 283.
Farcimoides, 3, 43, 46.
  domingoense, 46, 47, 284.
  orbignyi, 46, 47, 284.
  sallei, 46, 285.
fasciata, Neocyclotus, 227, 256.
  Poteria, 256.
fasciatum, Aperostoma, 223, 256, 257, 282, 290.
Filocyclus, 151, 157.
  delphinulus, 158, 282, 287.
filoliratum, Aperostoma, 221, 267, 280, 291.
filo-liratus, Cyclotus, 267.
  Poteria, 267.
fischeri, Aperostoma, 222, 239, 280, 290.
  Cyclotus, 239.
  Cyrtotoma, 169, 170, 281, 288.
  Poteria, 239.
fischerianus, Neocyclotus, 258.
flavidum, Cyclostoma, 45.
flavidus, Turbo, 45.
flavula, Cyclostoma, 45.
  Megalomastoma, 44, 45.
flavulum, Farcimen, 45.
floccosum, Crocidopoma, 39, 62, 64, 65, 282.
  Cyclostoma, 39, 62, 64.
floccosus, Cyclotus, 64.
florencianum, Farcimen, 11, 12, 283.
fonticula, Cyclopilsbrya, 80, 81, 285, 291.
fonticulus, Neocyclotus, 81.
fossile, Aperostoma, 125, 131, 287.
fultoni, Aperostoma, 222, 242, 279, 290.
gayi, Amphicyclotus, 278.
  Cyclophorus, 278.
  Cyclostoma, 278.
  Incerticyclus, 278, 279.
gealei, Megalomastoma, 143.
  Tomocyclus, 142, 143, 147, 281, 287.
gemma, Cyclotus, 87.
  Neocyclotus, 87.
  Ptychocochlis, 83, 87, 285.
gigantea, Poteria, 238.
giganteum, Aperostoma, 221, 222, 237, 238, 239, 277, 281, 290.
  Cyclostoma, 124, 237, 238.
  Farcimen, 15, 16, 283.
giganteus, Cyclotus, 238.
  Neocyclotus, 238, 239.
glabra, Helix, 45.
glaucostoma, Cyclotus, 200.
  Poteria, 200.
glaucostomum, Aperostoma, 196, 199, 282, 288.
  Cyclostoma, 199.
glaucostomus, Cyclotus, 199.
  Neocyclotus, 200.
glenburniensis, Cyclopilsbrya, 71, 73, 75, 285.
goldfussi, Amphicyclotus, 184, 281.
  Aperostoma, 184.
  Cyclophorus, 184.
goldmani, Cyrtotoma, 169, 173, 174, 281, 288.
gossei, Ptychocochlis, 83, 85, 286.
gracilius, Megalomastoma, 147, 148.
granulatum, Aperostoma, 196, 280, 288.
granulatus, Cyclotus, 196.
  Neocyclotus, 196.
  Poteria, 196.
grenadense, Aperostoma, 133, 134, 135, 287.
  Cyclostoma, 134.
guadeloupensis, Amphicyclotulus, 54, 55, 58, 60, 285.
guanense, Farcimen, 37, 284.
guantanamense, Farcimen, 7, 10, 283.
guatemalense, Cyclostoma, 144.
  Megalomastoma, 144.
guatemalensis, Tomocyclus, 143, 144, 281, 287.
guayaquilense, Calaperostoma, 159, 161, 280, 287.
  Cyclostoma, 161.
guayaquilensis, Amphicyclotus, 161.
  Cyclophorus, 161.
guitarti, Farcimen, 17, 19, 283.
gundlachi, Crocidopoma, 39, 41, 42, 284.
  Farcimen, 27, 28, 284.
  Megalomastoma, 28.
gundlachiellum, Farcimen, 27, 28, 284.
gutierrezi, Farcimen, 15, 16, 17, 283.
Habropoma lutescens, 181.
  mexicanum, 171, 173.
  salleanum, 170.
haematomma, Amphicyclotus, 155.
  Cyclophorus, 155.
  Lagocyclus, 154, 155, 156, 280, 287, 291.
haitia, Cyclohaitia, 53, 285.
haughti, Aperostoma, 268, 269, 279, 289.
hedui, Aperostoma, 187, 191, 279, 288.
Helix crocea, 44. 45.
  glabra, 45.
hendersoni, Cyclopilsbrya, 71, 72, 285.
  Farcimen, 35, 36, 284.
  Ptychocochlis, 83, 96, 286.

hidalgoi, Amphicyclotus, 167.
  Calaperostoma, 159, 166, 167, 279, 287.
  Cyclophorus, 167.
hinkleyi, Aperostoma, 203, 204, 206, 207, 281, 289.
hitomi, Aperostoma, 187, 194, 280, 288.
hjalmersoni, Farcimen, 44, 45, 285.
  Megalomastoma, 45.
holguinense, Farcimen, 7, 8, 283.
humile, Aperostoma, 129, 287.
idolum, Cyclostoma, 25.
ignotum, Crocidopoma, 41, 42, 284.
  Cyrtotoma, 169, 170, 281, 288.
imitator, Poteria, 107, 108, 286.
inca, Aperostoma, 221, 267, 279, 291.
  Cyclostoma, 267.
  Cyclotus, 244, 267.
  Neocyclotus, 245, 267.
  Poteria, 267.
Incerticyclus, 137, 275.
  bakeri, 137 138, 139, 287.
  bowdenensis, 138, 139, 291.
  braziliensis, 277, 279, 291.
  cayennensis, 276, 281.
  cinereus, 141, 287.
  connivens, 275, 282, 291.
  distinctus, 275, 291.
  duffianus, 276, 282.
  gayi, 278, 279.
  martinicensis, 140.
  perpallidus, 139, 287.
  perplexus, 140, 287.
  prominulus, 277, 279, 291.
  schermoi, 138, 291.
Incidostoma, 187.
  hedui, 191.
  hitomi, 194.
  incomptum, 192.
  kobelti, 190.
  malleatum, 188.
  nirafe, 193.
  pergrandis, 188.
  pichinchense, 191.
  pizarroi, 193.
  stirlingi, 195.
incomptum, Aperostoma, 187, 192, 282, 288.
  Cyclostoma, 191, 192, 276.
incomptus, Cyclotus, 191.
  Neocyclotus, 192.
  Poteria, 192.
  Pterocyclos, 192.
inconspicuum, Aperostoma, 221, 227, 282, 289.
  Cyclostoma, 227.
  Poteria, 227.
inornata, Cyclostoma, 61.
inutilis, Cyclotus, 107, 115.
  Neocyclotus, 115.
  Poteria, 115.
irregulare, Aperostoma, 222, 236, 280, 290.
  Cyclostoma, 236.
  Poteria, 236.
irregularis, Cyclotus, 236.
  Neocyclotus, 236.
itinerarium, Farcimen, 35, 284.
jamaicense, Aperostoma, 105.
  Cyclostoma, 105, 106, 109, 112.
  Cyclotus, 123.
jamaicensis, Cyclotus, 115.
  Neocyclotus, 82.
  Poteria, 106, 107, 112, 286.
  Turbo, 82, 93, 105, 106, 112.
jugosa, Cyclopilsbrya, 71, 76, 285, 291.
jugosum, Cyclostoma, 71, 76.
jugosus, Cyclotus, 76.
  Neocyclotus, 76.
knobbei, Neocyclotus, 101.
kobelti, Aperostoma, 187, 190, 279, 288.
kugleri, Aperostoma, 196, 201, 282, 289.
lacteofluviale, Aperostoma, 98.
lacteofluvialis, Ptychocochlis, 84, 98, 286.
laevitesta, Cyclopilsbrya, 80, 82, 285.
  Poteria, 82.
Lagocyclus, 151, 154, 159.
  antoni, 154, 156, 280, 287.
  bartletti, 154, 157, 282, 287.
  crosseanus, 154, 155, 156, 280, 287.
  haematomma, 154, 155, 156, 280, 287, 291.
  vasconesi, 154, 156, 280, 287.
lagunillense, Farcimen, 37, 38, 284.
laxatum, Aperostoma, 222, 244, 280, 290.
  Cyclostoma, 244.
  Poteria, 244.
laxatus, Cyclotus, 244.
  Neocyclotus, 244.
leai, Aperostoma, 221, 222, 246, 282, 290.
  Calaperostoma, 159, 165, 279, 288.
leonellum, Farcimen, 29, 284.
leoni, Farcimen, 17, 19, 283.
leoninum, Farcimen, 29, 284.
  Megalomastoma, 29.
limellum, Aperostoma, 196, 197, 199, 201, 279, 288.
limensis, Pupa, 148.
lineata, Poteria, 106, 107, 109, 110, 115, 286, 291.
lineatus, Cyclotus, 105, 109.
Liracyclotus, 186, 274.
  psilomitus, 274, 282, 287.
liratus, Amphicyclotulus, 54, 58, 60, 285.
  Cyclophorus, 58, 141.
Lomastoma, 43.
lutescens, Amphicyclotus, 181.
  Aperostoma, 181.
  Cyclophorus, 180, 181.
  Cyclostoma, 181.
  Habropoma, 181.
  Mexcyclotus, 179, 180, 181, 288.
magister, Farcimen, 17, 19, 283.
  Poteria, 116, 119, 287.
magna, Cyclotus, 101.
  Ptychocochlis, 84, 101, 286.
magnificum, Farcimen, 22, 283.
major, Aperostoma, 269, 270, 279, 289.
  Poteria, 270.

maleri, Amphicyclotus, 184, 185, 220, 281, 288.
  Cyclophorus, 185.
malleatum, Aperostoma, 187, 188, 189, 190, 191, 282, 288.
manabense, Aperostoma, 222, 239, 280, 290.
manchesterensis, Ptychocochlis, 83, 88, 285.
mani, Cyclostoma, 30.
  Farcimen, 30, 284.
  Megalomastoma, 30.
marianna, Ptychocochlis, 83, 97, 286.
martensi, Neocyclotus, 95.
  Ptychocochlis, 82, 83, 95, 286, 291.
martianum, Farcimen, 13, 14, 283.
martinezi, Buckleya, 152.
  Buckleyia, 151, 152, 154, 280, 287.
  Cyclophorus, 152.
martinicense, Cyclostoma, 140.
martinicensis, Incerticyclus, 140.
masvense, Aperostoma, 223, 254, 280, 290.
mayajiguense, Farcimen, 11, 12, 283.
mayariense, Farcimen, 7, 8, 10, 283.
mayense, Farcimen, 7, 10, 283.
mcsweeni, Aperostoma, 132, 134, 135, 287.
Megacyclotus, 151, 181.
  palenquensis, 182, 183, 281, 288.
  ponderosus, 182, 183, 281, 288.
Megaloma, 43.
Megalomastoma, 3, 41, 43, 48, 50, 51.
  antillarum, 49, 50, 284.
  apertum, 26, 27.
  brunnea, 48, 49.
  brunneum, 48, 49, 284, 285.
  complanatum, 38.
  curtum, 44.
  cyclindraceum, 45.
  digitale, 23.
  flavula, 44, 45.
  gealei, 143.
  gracilius, 147, 148.
  guatemalense, 144.
  gundlachi, 28.
  hjalmersoni, 45.
  leoninum, 29.
  mani, 30.
  minor, 16.
  minus, 147, 148.
  mirandum, 9.
  petiti, 48, 49, 50, 284.
  procer, 38.
  seminudum, 7, 19.
  simulacrum, 146.
  torrei, 20.
  tortum, 5, 6.
  ungula, 9.
  verruculosum, 51, 284.
Megalomastominae, 3, 43, 142.
Megalomastomoides, 3, 48, 50.
  verruculosum, 51.
merrilli, Aperostoma, 223, 262, 263, 264, 279, 290.
Mexcyclotus, 151, 179.
  cooperi, 180, 181, 281, 288.
  lutescens, 179, 180, 181, 288.
mexicanum, Aperostoma, 173.
  Cyclostoma, 124, 173.
  Cyrtotoma, 169, 173, 174, 281, 288.
  Habropoma, 171, 173.
mexicanus, Cyclophorus, 173.
  Cyclotus, 173.
milleri, Crocidopoma, 62, 66, 285.
mineri, Amphicyclotulus, 54, 55, 58, 60, 285.
minor, Cyclotus, 100, 213.
  Farcimen, 15, 16, 283.
  Megalomastoma, 16.
  Neocyclotus, 260.
  Poteria, 213.
  Ptychocochlis, 84, 100, 286.
minus, Megalomastoma, 147, 148.
mirandum, Farcimen, 7, 9, 283.
  Megalomastoma, 9.
montegoensis, Ptychocochlis, 84, 101, 286.
montezumi, Aperostoma, 151, 152.
moricandi, Amphicyclotus, 220.
  Aperostoma, 219, 279, 291.
  Cyclostoma, 220.
multilineatus, Cyclotus, 212.
multistriatinum, Farcimen, 31, 32, 284.
najazaense, Farcimen, 13, 14, 283.
nana, Poteria, 116, 120, 286.
nanum, Aperostoma, 223, 262, 263, 282, 290.
Neocyclotus, 125, 187, 203.
  affinis, 210.
  ambiguus, 211.
  asperulus, 78.
  bakeri, 137.
  bartletti, 157.
  belli, 201, 268.
  berendti, 212.
  beswicki, 79.
  bisinuatus, 235.
  bogotensis, 226.
  boucardi, 177.
  caucaensis, 258.
  chrysacme, 219.
  cingulatus, 228, 253.
  colombiensis, 258.
  connivens, 275.
  corpulentus, 217.
  corrugatior, 84.
  corrugatissimus, 110.
  crassus, 113.
  cycloatus, 110.
  dentistigmatus, 120.
  depressus, 247.
  distinctus, 275.
  duffianus, 277.
  dunkeri, 230.
  dysoni, 208, 209.
  fasciata, 227, 256.
  fischerianus, 258.
  fonticulus, 81.
  gemma, 87.

Neocyclotus giganteus, 238, 239.
    glaucostomus, 200.
    granulatus, 196.
    inca, 245, 267.
    incomptus. 192.
    inutilis, 115.
    irregularis, 236.
    jamaicensis, 82.
    jugosus, 76.
    knobbei, 101.
    laxatus, 244.
    martensi, 95.
    minor, 260.
    nodosus, 114.
    notatior, 122.
    notatus, 114.
    novae-spei, 117.
    pallescens, 111.
    panamensis, 197.
    pazi, 257.
    peilei, 200.
    perezi, 259.
    pergrandis, 188, 190.
    perpallidus, 139.
    peruvianus, 252.
    popayanus, 264.
    quitensis, 250.
    rupisfontis, 74.
    stramineus, 198.
    subcingulatus, 249.
    subrugosus, 105.
    thielei, 72.
    translucidus, 272.
    trinitensis, 271.
    varians, 86.
    westmorelandensis, 72.
    zigzag, 90.
Neopupina, 3, 5, 43.
    croceum, 45.
    curtum, 44.
    hjalmersoni, 45.
nevadense, Aperostoma, 223, 255, 282, 290.
nicaraguense, Aperostoma, 205, 214, 216, 281, 289.
nigrofasciatum, Calaperostoma, 159, 164, 166, 280, 288.
nigrofasciatus, Amphicyclotus, 164.
    Cyclophorus, 164.
nirafe, Aperostoma, 187, 193, 195, 279, 288.
nodosa, Poteria, 114.
nodosus, Cyclotus, 107, 114.
    Neocyclotus, 114.
notata, Poteria, 114.
notatior, Cyclotus, 122, 123.
    Neocyclotus, 122.
    Poteria, 116, 122, 123, 286.
notatus, Cyclotus, 107, 114.
    Neocyclotus, 114.
novae-spei, Cyclotus, 115, 117.
    Neocyclotus, 117.
    Poteria, 115, 116, 117, 286.
novussaltus, Cyclotus, 112.
obesum, Farcimen, 20, 21, 283.
occidentale, Adelopoma, 52, 148, 149, 150, 151, 282, 291.
    Diplommatina, 52.
occidentalis, Diplommatina, 52.
    Palaina, 52.
olivaceum, Aperostoma, 222, 251, 252, 280, 290.
olssoni, Amphicyclotus, 178.
    Calacyclotus, 178, 179, 279, 281, 288.
orbignyi, Amphicyclotus, 168.
    Calaperostoma, 159, 168, 279.
    Cyclophorus, 168.
    Cyclostoma, 46, 47.
    Farcimoides, 46, 47, 284.
orcutti, Crocidopoma, 62, 66, 285.
    Ptychocochlis, 84, 99, 286.
paezense, Aprostoma, 221, 225, 279, 289.
paezicolum, Aperostoma, 221, 232, 280, 290.
pailaense, Aperostoma, 221, 231, 280, 289.
Palaina occidentalis, 52.
    stolli, 149.
palenquense, Aperostoma, 183.
palenquensis, Megacyclotus, 182, 183, 281, 288.
pallescens, Cyclostoma, 111.
    Cyclotus, 111.
    Neocyclotus, 111.
    Poteria, 107, 111, 286.
palmeri, Cyrtotoma, 169, 172, 281, 288.
panamense, Aperostoma, 196, 197, 281, 288.
panamensis, Neocyclotus, 197.
    Poteria, 197.
parva, Cyclotus, 76, 77.
pazi, Aperostoma, 217, 257, 280, 290.
    Cyclotus, 257.
    Neocyclotus, 257.
    Poteria, 257.
peilei, Aperostoma, 196, 200, 279, 288.
    Neocyclotus, 200.
perconvexum, Farcimen, 78, 283.
perdistinctum, Aperostoma, 276.
    Crocidopoma, 39, 40, 284.
perdistinctus, Cyclotus, 39, 40.
perezi, Aperostoma, 223, 259, 280, 290.
    Cyclotus, 259.
    Neocyclotus, 259.
    Poteria, 259.
pergrandis, Aperostoma, 187, 188, 190, 279, 288.
    Neocyclotus, 188, 190.
    Poteria, 188.
perpallidum, Cyclostoma, 139.
perpallidus, Cyclostoma, 139.
    Cyclotus, 139.
    Incerticyclus, 139, 287.
    Neocyclotus, 139.
perplexus, Amphicyclotulus, 54, 59, 285.
    Incerticyclus, 140, 287.
peruense, Aperostoma, 222, 245, 247, 282, 290.
peruvianum, Aperostoma, 223, 252, 282, 290.

peruvianus, Neocyclotus, 252.
    Poteria, 252.
petiti, Megalomastoma, 48, 49, 50, 284.
petricola, Ptychocochlis, 104, 286.
pichinchense, Aperostoma, 187, 191, 280, 288.
piscinalis, Valvata, 141.
pittieri, Aperostoma, 222, 236, 280.
    Calaperostoma, 159, 164, 281, 287.
    Cyclotus, 236.
    Poteria, 236.
pizarroi, Aperostoma, 187, 193, 194, 195, 282, 288.
plana, Poteria, 107, 113, 114, 286.
Platyraphe, 220.
Platystoma, 82.
    dysoni, 208.
Plectocyclotus, 106.
poeyi, Farcimen, 17, 18, 19, 283.
ponderosum, Cyclostoma, 182, 276.
ponderosus, Amphicyclotus, 182.
    Cyclophorus, 182.
    Megacyclotus, 182, 183, 281, 288.
popayana, Cyclostoma, 264.
    Poteria, 256, 264.
popayanum, Aperostoma, 223, 264, 266, 280, 291.
popayanus, Cyclotus, 264.
    Neocyclotus, 264.
portlandensis, Cyclotus, 93, 94.
portobellense, Aperostoma, 222, 242, 281, 290.
portoricensis, Amphicyclotulus, 54, 59, 285.
    Cyclotus, 59.
Poteria, 62, 82, 105, 106.
    affinis, 210.
    ambiguus, 211.
    aulari, 199.
    balnearis, 116, 123, 286.
    bartletti, 157.
    bejumensis, 270.
    berendti, 212.
    blanchetianum, 245.
    bogotensis, 226.
    bondi, 68.
    burringtoni, 107, 286.
    campeachyi, 104.
    cardozi, 266.
    caribaea, 77.
    caucaensis, 258.
    caymanensis, 80.
    chittyi, 116, 121, 286.
    cingulatum, 228.
    colombiensis, 258.
    confusum, 237.
    corpulentus, 217.
    corrugatissima, 107, 110, 111, 112, 114, 286.
    crassa, 107, 113, 286.
    cycloata, 109, 110, 286.
    dentistigmata, 116, 120, 287, 291.
    depressus, 247.
    dunkeri, 230, 256.
    dysoni, 208.
    fasciata, 256.
Poteria filo-liratus, 267.
    fischeri, 239.
    gigantea, 238.
    glaucostoma, 200.
    granulatus, 196.
    imitator, 107, 108, 286.
    inca, 267.
    incomptus, 192.
    inconspicuum, 227.
    inutilis, 115.
    irregulare, 236.
    jamaicensis, 106, 107, 112, 286.
    laevitesta, 82.
    laxatum, 244.
    lineata, 106, 107, 109, 110, 115, 286, 291.
    magister, 116, 119, 287.
    major, 270.
    minor, 213.
    nana, 116, 120, 286.
    nodosa, 114.
    notata, 114.
    notatior, 116, 122, 123, 286.
    novaespei, 115, 116, 117, 286.
    pallescens, 107, 111, 286.
    panamensis, 197.
    pazi, 257.
    perezi, 259.
    pergrandis, 188.
    peruvianus, 252.
    pittieri, 236.
    plana, 107, 113, 114, 286.
    popayana, 256, 264.
    quitensis, 250.
    rugata, 202.
    sanctaemarthae, 218.
    santaguitensis, 272, 273.
    smithi, 216.
    stramineus, 198.
    subcingulatum, 249.
    taylori, 118, 119, 287.
    translucida, 272.
    trinitensis, 136, 271.
    tryoniana, 116, 286.
    vincentiana, 133.
    welchi, 116, 118, 119, 286
    yallahsensis, 116, 123, 287.
pretiosum, Aperostoma, 126, 127, 287.
pretiosus, Cyclotus, 127.
princeps, Aperostoma, 175.
    Barbacyclus, 175, 280, 288.
procer, Farcimen, 38, 284.
    Megalomastoma, 38.
prominula, Cyclostoma, 277.
prominulus, Incerticyclus, 277, 279, 291.
pseudotortum, Farcimen, 5, 6, 7, 26, 283.
psilomitum, Cyclostoma, 274.
psilomitus, Amphicyclotus, 274.
    Cyclophorus, 274.
    Liracyclotus, 274, 282, 287.
Pterocyclos, 161.
    incomptus, 192.
Ptychocochlis, 62, 82.
    adamsi, 83, 94, 95, 286.
    campeachyi, 84, 103, 104, 286.
    clappi, 82, 83, 91, 286.
    corrugata, 82, 83, 93, 95, 286.

Ptychocochlis corrugatior, 83, **84**, 85, 86, 286.
gemma, 83, **87**, 285.
gossei, 83, **85**, 286.
hendersoni, 83, **96**, 286.
lacteofluvialis, 84, **98**, 286.
magna, 84, **101**, 286.
manchesterensis, 83, **88**, 285.
marianna, 83, **97**, 286.
martensi, 82, 83, **95**, 286, 291.
minor, 84, **100**, 286.
montegoensis, 84, **101**, 286.
orcutti, 84, **99**, 286.
petricola, **104**, 286.
savannensis, 82, 84, **98**, 286.
senex, 83, **92**, 286.
shawae, 83, 90. 286.
simpsoni, 83, **95**, 286.
subglobosa, 84, **103**, 286.
subrugosa, 83, **105**, 286.
taylori, 83, **89**, 286.
varians, 83, **86**, 286.
vendreysi, 82, 84, **102**, 286.
welchi, 83, **88**, 285.
zigzag, 83, **90**, 286.
pulchellum, Aperostoma, 223, **263**, 279, 290.
Pupa limensis, 148.
Pupoides, 148.
purum, Calaperostoma, 159, **162**, 280, 287.
Cyclostoma, 162.
pygmaeum, Aperostoma, 269, **272**, 282, 289.
quitense, Aperostoma, 222, **250**, 280, 290.
Cyclostoma, 250.
quitensis, Cyclotus, 250.
Neocyclotus, 250.
Poteria, 250.
redfieldi, Aperostoma, 223, **261**, 279, 290.
rocai, Farcimen, **23**, 284.
rosenbergi, Amphicyclotus, 160.
Calaperostoma, 159, **160**, 280, 287.
Cyclophorus, 160.
ruatanense, Aperostoma, 204, **207**, 281, 289.
ruber, Aperostoma, **125**, 126, **127**, 128, 287.
Cyclotus, 126.
rudisplanusque, Aperostoma, 125, **131**, 287.
rudis-planusque, Cyclotus, 131.
rufescens, Amphicyclotulus, 54, **56**, 57, 285.
Cyclostoma, 56.
rufilabris, Cyclopilsbrya, 71, **78**, 79, 285.
Cyclotus, 78.
rugata, Poteria, 202.
rugatum, Aperostoma, **133**, 286.
rugatus, Cyclotus, 133.
rupisfontis, Cyclopilsbrya, 71, **74**, 285.
Cyclotus, 74.
Neocyclotus, 74.
salengoense, Aperostoma, 223, **253**, 280, 290.
salleanum, Aperostoma, 170.
Cyrtotoma, 169, **170**, 281, 288.
Habropoma, 170.
salleanus, Cyclophorus, 170.
sallei, Aperostoma, 205, **213**, 281, 289.
Farcimoides, **46**, 285.
sanctaemarthae, Aperostoma, 203, **217**, **218**, 279, 289.
Poteria, 218.
santaguitense, Aperostoma, 289.
santaguitensis, Poteria, 272, 273.
savannensis, Ptychocochlis, 82, 84, **98**, 286.
scabratum, Aperostoma, 125, **129**, 287.
schermoi, Incerticyclus, **138**, 291.
schrammi, Amphicyclotulus, 54, **57**, 58, 285.
Cyclostoma, 57.
scopulorum, Farcimen, 4, **33**, 284.
seminudum, Aperostoma, 109, 125, **128**, 129, 130, 131, 287, 291.
Cyclostoma, 125, 126, **130**.
Farcimen, **17**, 19, 283.
Megalomastoma, 7, 19.
seminudus, Cyclostoma, 130.
semivestitum, Farcimen, 7, 8, 283.
senectum, Farcimen, **24**, 284.
senex, Ptychocochlis, 83, **92**, 286.
shawae, Ptychocochlis, 83, **90**, 286.
simile, Aperostoma, 221, **227**, 280, 289.
simpsoni, Ptychocochlis, 83, **95**, 286.
simulacrum, Cyclostoma, 146.
Megalomastoma, 146.
Tomocyclus, 142, 143, 144, **146**, 147, 281, 287.
siphonis, Tomocyclus, 143, **145**, 146, 281.
smithi, Aperostoma, 203, 204, **216**, 217, 279, 289.
Poteria, 216.
solenatum, Cyclostoma, 25.
stirlingi, Aperostoma, 187, **195**, 280, 288.
stolli, Adelopoma, **149**, 281, 291.
Diplommatina, 149.
Palaina, 149.
stramineum, Aperostoma, 132, 195, **196**, 198, 282, 288.
Cyclostoma, 198, 276.
stramineus, Cyclotus, 198.
Neocyclotus, 198.
Poteria, 198.
striata, Cyclostoma, 165
striatum, Cyclostoma, 165.
striosa, Cyclopilsbrya, 71, **75**, 76, 285.
striosus, Cyclotus, 75.
subcingulatum, Aperostoma, 222, **249**, 251, 280, 290.
Poteria, 249.
subcingulatus, Neocyclotus, 249.
subglobosa, Ptychocochlis, 84, **103**, 286.
subobesum, Farcimen, 20, **21**, 283.
subrugosa, Ptychocochlis, 83, **105**, 286.
subrugosum, Cyclostoma, 105.
subrugosus, Cyclotus, 105.
Neocyclotus, 105.
subventricosum, Farcimen, 31, **32**, 284.

sumichrasti, Aperostoma, 204, 209, 211, 281, 289.
superbum, Farcimen, 34, 35, 284.
suturale, Cyclostoma, 68, 69.
suturalis, Cyclojamaicia, 68, 69, 70, 285.
taylori, Poteria, 118, 119, 287.
  Ptychocochlis, 83, 89, 286.
texturatum, Cyclostoma, 186, 276.
texturatus, Amphicyclotus, 184, 186, 281, 288.
  Cyclophorus, 186.
thielei, Neocyclotus, 72.
Tomocyclus, 3, 142.
  constrictus, 143, 145, 281, 287.
  copanensis, 143, 147, 281, 287.
  gealei, 142, 143, 147, 281, 287.
  guatemalensis, 143, 144, 281, 287.
  simulacrum, 142, 143, 144, 146, 147, 281, 287.
  siphonis, 143, 145, 146, 281.
toroense, Crocidopoma, 40, 284.
torrei, Farcimen, 20, 284.
  Megalomastoma, 20.
tortum, Cyclostoma, 4, 26, 38.
  Farcimen, 4, 5, 26, 284.
  Megalomastoma, 5, 6.
tortus, Turbo, 4, 5, 26.
translucida, Poteria, 272.
translucidum, Aperostoma, 136, 179, 268, 269, 272, 279, 289.
  Cyclostoma, 272.
translucidus, Cyclotus, 271, 272.
  Neocyclotus, 272.
trinitense, Aperostoma, 136, 268, 269, 271, 287, 289.
trinitensis, Cyclotus, 136, 271.
  Neocyclotus, 271.
  Poteria, 136, 271.
truncatum, Cerion, 45.
tryoniana, Poteria, 116, 286.
tryonianum, Aperostoma, 116.
tucma, Adelopoma, 148, 279, 291.
Turbo flavidus, 45.
  jamaicensis, 82, 93, 105, 106, 112.
  tortus, 4, 5, 26.
turquinoense, Farcimen, 5, 6, 283.
umbilicatum, Aperostoma, 221, 224, 225, 226, 279, 289.
Underwoodi, Amphicyclotus, 176.
  Barbacyclus, 175, 176, 178, 280, 288.
underwoodi, Cyclophorus, 176.
ungula, Farcimen, 5, 7, 9, 10, 283.
  Megalomastoma, 9.
utriaense, Aperostoma, 222, 240, 241, 280, 290.
valerioi, Aperostoma, 205, 213, 215, 280, 289.
Valvata piscinalis, 141.
varians, Cyclostoma, 86, 92, 93, 127, 128.
  Cyclotus, 86.
  Neocyclotus, 86.
  Ptychocochlis, 83, 86, 286.
vasconesi, Cyclophorus, 156.
  Lagocyclus, 154, 156, 280, 287.
vendreysi, Ptychocochlis, 82, 84, 102, 286.
venezuelense, Aperostoma 222, 247, 248, 282, 290.
ventricosa, Cyclostoma, 30.
ventricosum, Farcimen, 30, 32, 284.
veracochanum, Aperostoma, 221, 229, 282, 289.
verruculosum, Cyclostoma, 51.
  Megalomastoma, 51, 284.
vesconesi, Amphicyclotus, 156.
  Cyclophorus, 156, 160.
vinalense, Farcimen, 32, 33, 284.
vincentina, Poteria, 133.
vincentinum, Aperostoma, 133, 286.
volvulus, Cyclophorus, 124.
  Cyclostoma, 124.
vortex, Crocidopoma, 62, 63, 65, 285.
  Cyclostoma, 63.
  Cyclotus, 63.
walkeri, Aperostoma, 174.
  Cyrtotoma, 169, 174, 281, 288.
welchi, Poteria, 116, 118, 119, 286.
  Ptychocochlis, 83, 88, 285.
westmorelandensis, Cyclopilsbrya, 71, 72, 295.
  Cyclotus, 72.
  Neocyclotus, 72.
wetmorei, Aperostoma, 203, 279, 291.
wrighti, Crocidopoma, 41, 42, 284.
  Farcimen, 12, 13, 283.
yallahsensis, Poteria, 116, 123, 287.
yunquense, Farcimen, 6, 283.
zigzag, Cyclotus, 90.
  Neocyclotus, 90.
  Ptychocochlis, 83, 90, 286.

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